THE

ELECTRICAL REVIEW.

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ELECTRICAL REVIEW.

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1914 EDITION

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ELECTRICITY FROM GAS.

SOME five years ago, when Messrs. Andrews and Porter read their paper on large gas engines before the I.E.E., the growing use of the internal-combustion engine was "the question of the day"; but the answer was apparently in the negative, for little has been done in this country in the direction of adopting large gas engines in central-station practice since that date. There is, however, one striking exception—namely, the Accrington Corporation—which, on the advice of its engineer, Mr. Harold Gray, put down producer gas plant with by-product recovery, and two 1,000-H.P. gas-engines and generators, in addition to its existing steam plant; and Mr. Gray's report for the past year—in his opinion the most important period in the existence of the undertaking—is now before us. The plant was fully described in our issues of August 15th and 22nd last year.

It may be remembered that the authors of the paper mentioned above regarded 2,000 H.P. as the limit below which by-product recovery could not be carried on profitably—and not even at that figure unless the load factor was exceptionally good; they suggested that where the gas plant was added to an existing steam plant, the former should be run continuously, and the latter should be employed for the peak loads, thus taking advantage to the utmost of the fuel economy of the gas engine, and the elasticity of the steam plant. Mr. Gray has run his plant somewhat on these lines; the producers have never been shut down, and both engines have been running daily and one all night—a fact which reflects great credit upon the engine builders, and not less upon Mr. Gray and his staff, for who expects a large gas engine to run continuously throughout the year? The result has been a sale of over four million units generated by the gas plant, and $1\frac{3}{4}$ millions by steam; using ordinary coal, for the most part, in the producers, the cost of fuel has worked out at 0·220d. per unit for gas, and 0·483d. for steam, the average price per ton of coal being in both cases 13s. 10d. The wages are high, because the gas plant is small, but it is being doubled in size, without requiring a larger staff. They work out at 0·126d. for gas, 0·200d. for steam.

Mr. Gray regards tar with little favour; it is troublesome to deal with, and brings in little profit, but it has to be got rid of; the sulphate of ammonia, on the other hand, pays for more than half the cost of the fuel, and although the recovery plant was in operation for only 38 weeks, having been started at the end of June, 1913, it returned a profit of 0·077d. per "gas unit." This can evidently be materially increased. The cost of oil, stores and repairs on the gas plant was 0·069d. per unit, compared with 0·079d. for steam; and the net result for works cost was 0·338d. per gas unit, and 0·762d. per steam unit, or for both plants combined 0·466d. per unit.

In considering these figures, it must be borne in mind that the gas plant was comparatively small, and was only in full operation for nine months; that the steam and gas stations were practically independent, so that the wages were higher than they would otherwise have been; and that the steam plant was not run for economy but for convenience. Making allowance for these facts, we think Mr. Gray is to

be congratulated on the large measure of success that he has attained in the past year, and there is every reason to anticipate that when he has the extended plant in full operation, with the experience that he has gained, he will be able to show results still better than those recorded above.

Unfortunately, the report does not include any statement of accounts, so that we are unable to ascertain the financial charges and the total cost of production; but seeing that the gas plant was run on a high load factor, we should expect to find that the result was not unsatisfactory.

The progress of the installation will be watched with keen interest by central-station engineers; the movement towards the more economical utilisation of coal is growing in strength and vitality, and in spite of the instinctive repugnance felt by the electrical engineer towards making his plant a chemical works, the pressure of events compels him to take into consideration every opening for economy, while the benefit to the community resulting from the manufacture of a fertiliser and the elimination of smoke needs no demonstration.

Road Maintenance.

At the Tramway Congress, held at Newcastle last week, the chairman, Mr. Stephen Sellon, took the opportunity of defining the attitude of the Tramways and Light Railways Association towards the question of maintenance of roads. Naturally, the Association feels that the burdens imposed upon electric tramways, which are forced to maintain the pavement which they cannot possibly use, are harsh and unreasonable, whereas their competitors, the motor-omnibuses, contribute nothing towards the upkeep of the roads, but, nevertheless, do an immense amount of damage to them. Moreover, the latter are not required to carry workmen at a loss. The Association, therefore, has approached the Local Government Board, with a view to securing an opportunity of stating the case for the tramways before the Departmental Committee which is inquiring into the subject.

The matter has also been raised in the House of Lords, in connection with the Bill of the Middlesex County Council for the construction of a new highway in the West End. Clause 24 authorised the Council to impose a charge of $\frac{3}{8}$d. per 'bus-mile on 'buses using the new road, and this was objected to on the ground that if motor-omnibuses, then other heavy vehicles ought to be taxed; but this is not necessarily a sound proposition. All members of the community are entitled to a reasonable user of the public roads, but in the case of public carriers of passengers or goods, the roads become actually part of their working plant, at present a free gift to them from the community. A shopkeeper's use of the road is merely incidental to his trade; customers may come to his shop and carry their purchases away, or he may send the goods to their houses, using the roads only for the transport of his own wares. The same thing applies to a manufacturer, the essential feature being that in either case the business would not be hindered, but rather aided, if the customers lived on his premises and roads were superfluous. But in that event the carrier's business would be gone—the road is his means of livelihood. That the 'buses quickly destroy ordinary roads is notorious — none know this better than cyclists, to their sorrow; delivery vans may traverse a certain road only once or twice a day, but the 'buses are hammering away at it all the time. We are glad to record, therefore, that the House of Lords approved the clause, which had been incorporated in other private Bills and had also passed the House of Commons, so that we may now regard the principle as having become a settled policy of Parliament. It still remains, however, to secure universal application of the principle by making an alteration in the general law, and to relieve the tramways of the onerous burdens under which they groan, and these tasks will, we hope, be energetically handled by the Departmental Committee. That action is urgently necessary is clearly shown by the unfortunate predicament of the various metropolitan tramway systems, due to the unfair competition to which they are subjected.

The Future of Electricity Supply in Berlin.

During the past two years informal conversations, which have been followed by actual negotiations more recently, have proceeded between representatives of the Berlin Electricity Works Co. and of the Municipal Council with respect to the future position of the supply business in that city as affected by the right of the latter to expropriate the former's undertaking on October 1st, 1915. Notice of intention to exercise the right has already been given, and of the two alternatives—purchase at the book value or at a valuation—the former has been selected provisionally. The service of notice to this effect is largely a formal proceeding, as the future of the supply undertaking is uncertain in consequence of the divided opinions which prevail in municipal circles, one section being in favour of entire expropriation, whilst another group expresses confidence in the establishment of a joint private and municipal enterprise as from October 1st, 1915. As will be remembered, the Electricity Works Co. has a monopoly of supply in Berlin and various suburbs, and in association with it stands the A.E.G., which, we believe, originally created the undertaking, and has a preferential right of delivery of all the machinery and plant required by it. The A.E.G., in fact, may be considered to be a constituent part of the enterprise, and it is, therefore, comprehensible that the company should also be associated with the supply company in the negotiations which are in progress, and which have now resulted in the preparation of a scheme for the reorganisation of the supply undertaking as a joint economical enterprise. The scheme provides in the first place for the handing over by the supply company of £1,000,000 in preference shares, free of charge, to the Municipal Council, and the concession agreement is to be prolonged from 1915 to the end of 1939. At present the concession applies to a sphere of interest amounting to 18·6 miles around Berlin. It is, however, suggested by the scheme that an additional superficial area of 9,300 sq. miles should be permitted to be added by the formation of a connection with the Berlin Suburban Electricity Works and the Mark Electricity Works, both of which are already associated directly or indirectly with the Berlin Electricity Works Co. and the A.E.G. The project also provides for a reduction in the supply charges and for the reversion to the city, free of charge, at the expiration of the agreement of all the plant existing at the beginning of the agreement, the plant representing £5,000,000 exclusive of sites and buildings. It would, however, be possible for the city to take over the undertaking during the currency of the agreement at certain periods and according to values to be determined by the remunerativeness of the undertaking. The city is to receive a fixed annual payment as well as a share in the profits; the preferential right of delivery enjoyed by the A.E.G. is to be curtailed to one half, and the A.E.G. is also to renounce its preferential right of subscription to new issues of shares by the Berlin Electricity Works Co. It remains to be seen whether the proposal for a joint enterprise will be accepted by the Municipal Council or whether the undertaking will be taken over entirely next year. In either case the future of the supply company is declared to be assured, as early precautions were adopted in the direction of securing a financial interest in other supply works, whilst at the same time profitable investment in other undertakings is held in prospect for the capital which would be rendered available if the supply company should be expropriated in 1915.

The Rubber Market.

The price of rubber has not altered much on balance, though there are a few fluctuations met with. There is, however, rather a disposition in some directions to take a slightly more cheerful view of the position, based upon the strong belief that we are getting near to the time when there must be an improvement in the United States. The whole tenor of American advices for months past has been one of gloom and depression, and it is impossible that rubber can have escaped from the temporary blight which seems to have

attacked trans-Atlantic trade. With some faint indications that things are on the turn for the better in America, a little new hope has been born in European circles, and there is a bare chance of things improving as regards the rubber market. The price of the commodity is certainly very moderate, and many people think that at to-day's rates the deficiencies in the situation, whatever they may be, have been about discounted. It would almost appear that all the bad points had already had their full play, and that any alteration must now be for the better. Even admitting this, however, there can be no suggestion of anything very dramatic in price developments favouring holders of rubber, or rubber shares, for the days of the memorable boom have gone, never to return. At the same time the prospect from a strictly producing and commercial standpoint is not at all discouraging, for while outputs of the plantations are being increased there is a steady and very material improvement proceeding in respect to the costs of yield, and this, in conjunction with the exercise of economical methods of estate management and development generally, is going to be of the utmost benefit to plantation companies in the long run. Of late there has been nothing more heard of the proposals for bringing about a combined selling organisation and probably it is just as well, for attempts to regulate trade currents are by no means an unmixed boon, and it is, on the whole, preferable to allow the rubber trade to find its own level in the matter of prices, free from adventitious aids, the more so as the aids proposed in this case might conceivably have worked damage ultimately to the cause they were intended to serve. A fair number of the growers whose assent had been given provisionally to the proposals put forward were really not much in sympathy with them, though they had joined, and if a practicable scheme had been evolved, would have stood by it.

At the auctions this week about 970 tons were submitted, the sales opening with a pretty steady demand, prices being much about the same as they were at the termination of the previous series, and up to 2s. 3¾d. was paid for smoked sheets, though this was exceptional, most of the parcels going at about 2s. 3½d. a lb. The tendency became rather irregular as the sales proceeded.

The exports of plantation rubber from the Straits Settlements for June totalled 1,480 tons, compared with 1,309 tons in May, and 812 tons in June of last year, details being appended :—

	1912.	1913.	1914.
January	253	784	1,181 tons
February	274	743	1,703 ,,
March	427	898	1,285 ,,
April	387	762	1,548 ,,
May	431	814	1,309 ,,
June	398	812	1,480 ,,
Total... ...	2,170	4,813	8,506 ,,

The Poor Man's Lawyer.

A County Court Judge recently took occasion to deplore the fact that while elaborate arrangements have been made to give legal aid to the poor in High Court cases, nothing has been done to facilitate their access to the County Court. Speaking for ourselves, we do not often find that the poor man with a good case has very much difficulty in obtaining all the legal assistance he requires.

Many years ago the late Lord Russell of Killowen expressed the opinion that it would be a misfortune if there were no lawyers who were willing to take up cases on the "no cure, no pay, principle." To judge from the enormous number of claims which are made annually under the Workmen's Compensation and other similar Acts, it is obvious that certain members of the legal profession have not been slow to take this judicial hint. In the electrical industry claims for compensation are frequently made by persons of very limited means, and we have never yet heard of an instance where there was a denial of justice because no lawyer could be found to take up a *bonâ fide* case. If a man has a bad claim, it is as well that the time of the Courts should not be taken up in considering it. There is a well-known legal maxim—*Interest reipublicæ ut sit finis litium.*

REVIEWS.

Incandescent Electric Lamps. By D. H. Ogley. London: Longmans, Green & Co., Ltd. Price 2/6 net.

It is a difficult task to condense information, in such a manner that all who read may understand, without omitting many important items; but Mr. Ogley has carried out his work in an admirable manner, and the omissions are few. They could have been reduced, however, by a careful revision of the work, and at the same time redundancy would have been avoided; we do not understand why certain curves and calculations should have been included a second time in other portions of the book.

In the first chapter the production and propagation of light are touched upon, and the matter contained under this heading should be of great use to those unfamiliar with the subject, for various terms are here explained in a manner which is exceptionally clear. Terms somewhat more technical are treated in the next chapter, and again we must commend their presentation. The second paragraph under the Law of Inverse Squares contains an obvious mistake which we trust will be remedied in future editions. Standard Light Sources occupy a considerable amount of space for such a work as this, and we think that the blue pencil might here have been used to advantage; on the other hand photometry and photometers are but briefly dealt with, but their principles are well set forth, so that it should be easy for one to understand the working of any instrument handled.

Chapter V is devoted to light distribution from incandescent sources and is very short, the matter only being treated in a general way. The next chapter, however, is unique, and one is enabled to learn much regarding the manufacture of carbon, tantalum and tungsten filament lamps. The characteristics of these lamps are then fully discussed, and many interesting points, which at first sight are not perfectly obvious, are set forth. A number of the tests are new, and betoken much patient care on the part of the author, who is able to write with first-hand knowledge. The effects of light sources upon one's optic nerves are then touched upon in a brief manner, but there is sufficient detail to enable one to comprehend the various arguments put forward in the following chapter, which deals with lighting systems. The illustrations consist largely of reproductions which have from time to time appeared in the technical Press, but they form an interesting collection which serves to contrast the good and bad points of lighting installations; various reflectors are depicted and described, as well as one or two fittings.

The next few pages deal exclusively with indirect lighting; a few illumination calculations, and a table of cosines cubed complete the book, which should commend itself to all those whose desire it is to obtain a knowledge of recent information regarding incandescent electric lamps and their application.

Problems in Alternating-Current Machinery. By Waldo V. Lyon. London: Hill Publishing Co. Price 6/3 net.

This book consists of a series of numerical examples intended to serve as problems for practice by honours students in their final year at college. No introductory matter is given, so that the student is expected to make use of his text-book or lecture notes for all the information he may need as to the methods of solution to be employed.

As is aptly stated in an introductory note by Prof. Clifford, of Harvard University, it requires a special gift to originate and develop problems which shall give sound training in the fundamentals of engineering, and whose solution shall not only interest the

student but shall train his intellectual power as well. Mr. Lyon evidently possesses this gift, but he also possesses the means of collecting varied and up-to-date data of actual machinery and the patience and industry necessary to make use of such valuable opportunities in framing an excellent collection of problems. The problems are arranged in a definite sequence in each chapter, corresponding as far as possible with the natural line of development of the principles underlying each particular type of machine in a college course.

The first chapter contains 98 problems dealing with the transformer. Taken in order, the subjects of the exercises include iron losses, flux densities, no-load current, copper losses, regulation and efficiency under load, auto-transformers, and the operation of transformers in parallel.

Chapter II contains 99 problems on synchronous generators which bear on the following matters:—Form-factor of generated E.M.F., virtual voltage generated, armature reactions, leakage reactance, synchronous reactance, regulation to be calculated from various data and employing various methods of solution, efficiency, operation in parallel, operation under test.

There follow separate chapters on synchronous motors (50 problems), induction motors (80 problems), rotary converters (61 problems), polyphase circuits (75 problems), and non-sinusoidal waves (44 problems). It is unnecessary to detail the character of the ground covered in each of these chapters, since what has been said of the first two will indicate sufficiently the range to be expected.

We can cordially recommend the book to teachers of advanced classes in electrical engineering, who are often in need of good representative problems for exercise work and even for examination papers. Students will also find such a collection useful for practice and most fruitful in suggesting thought and further inquiry in many directions.

We are inclined to regret the absence of answers to the questions, as these would have been useful both to the teacher and the student. We learn from the Preface that answers will be published later, and will be available "to all but undergraduate students." What a memory of the forbidden but dog-eared "crib" of by-gone days does this recall!

The Inventors' Adviser and Manufacturers' Handbook to Patents, Designs, and Trade Marks. By REGINALD HADDAN. London: Harrison & Sons. Price 5s. net.

THE fact that Mr. Haddan's well-known volume has reached a ninth edition shows that his efforts to provide a suitable book for the use of patentees have been well appreciated.

In his preface he draws attention to the fact that the British Patent Law was altered in 1905. Before that year any person taking out a patent in the English Patent Office had no guarantee that his invention was worth anything; but he now has the satisfaction of knowing that it is not covered by anything which is to be found in the records of the English Patent Office for the last 50 years, or, at any rate, he is warned if it is discovered in the Office that his invention has been anticipated.

As Mr. Haddan points out, other causes of invalidity besides anticipation are omitted from investigation, while the invention may also have been described in a foreign patent office, or in one or other of the technical journals published in many parts of the world. It follows from this that the recent change in British patent law has by no means rendered a book like Mr. Haddan's useless to the inventor. Indeed, it might almost be said that the value of the work has become enhanced, because it is more difficult than ever for the patentee to know exactly how he stands.

We have examined the work before us, as far as possible from the point of view of the layman, and it must be admitted that Mr. Haddan has handled a technical subject in a manner which can be well understood by the patentee who has never been inside a court of law. What we like in particular about his style of writing is that instead of crowding his text with the effects of a number of cases, he selects typical decisions and gives extracts from time to time in the language actually used by the judges. For readers who have no opportunity of consulting the reports of the Patent Office, this method of treatment is distinctly advantageous.

Not by any means the least useful part of the book is that which gives in short and concise paragraphs a description of the patent laws in various parts of the world. From Algeria to Japan, from Uganda to the State of Luxembourg, every country and kingdom appears to be dealt with in the latter half of this volume. Some of the descriptions of the patent laws of these countries are no doubt rather exiguous; but when there is no patent law in a particular country the fact is recorded. For instance, it may come as a shock to some to hear that there is no patent law in Servia.

Altogether we may commend Mr. Haddan's work to the lay patentee. Not only will it be of assistance to him, but we think it very likely that it will prove useful to those who practise as patent agents.

CORRESPONDENCE.

Letters received by us after 5 P.M. ON TUESDAY *cannot appear until the following week. Correspondents should forward their communications at the earliest possible moment. No letter can be published unless we have the writer's name and address in our possession.*

Proposed Central Testing Institution.

Much has been written of late about the position of British manufacturers endeavouring to sell their goods in the Canadian market, consequent on the attitude of the Fire Offices, which require compliance with the code of the Chicago Board of Underwriters. This matter actively engaged my attention a year or two ago, when the position became acute, and in May, 1913, I addressed a letter to the secretary of the Institution of Electrical Engineers putting forward my views. As this letter relates to a purely industrial matter, and the Industrial Committee has been dissolved, it is improbable that the Institution will be able to deal with it. With the permission of the President, I now send you a copy of my letter, in case you should think its contents of sufficient importance to the electrical industry to warrant publication in your columns.

C. H. Wordingham.

Redhill, Surrey,
July 16th, 1914.

[COPY.]

3rd May, 1913.

P. F. ROWELL, ESQ.,
The Institution of Electrical Engineers,
Victoria Embankment, W.C.

DEAR MR. ROWELL,—In my paper read before the Institution in 1899 the proposal for a central testing institution was, so far as I know, first made. Although I believe the time was then ripe for the establishment of such an institution, the electrical industry was not prepared to support the proposal, and even received it with a certain amount of hostility, so that the matter dropped.

The value and importance of a universally recognised testing authority has now been very poignantly brought home to the electrical manufacturers of this country by the powerful position occupied by the testing bureau of the American fire offices in the United States and in Canada, and the proposal to found a testing institution in this country has in consequence of the position which has arisen attracted a considerable amount of attention, but ideas as to what is required are extremely divergent, and the whole affair is in a very nebulous condition.

When I made my original proposal its scope was very modest, and the chief object was to set a high standard of design and manufacture for fittings to be used on installations supplied by public undertakers in this country and to afford a ready means whereby central station engineers of municipal and company concerns, as well as consulting engineers, could ascertain that the prescribed standard of excellence had been attained. At the time I proposed only to test *types* of appara-

tus and to leave the user to take his own measures for ensuring that the individual articles supplied to him conformed to the type. The American Bureau goes very much further than this and professes to inspect, and attach labels to, every individual article that is used.

The first question to consider is whether the National Electrical Proving House should be a branch of the American or closely affiliated to it or whether it should be an entirely separate and independent concern. I am unhesitatingly of opinion that it should be the latter. The British electrical industry should set its own standards and should take its own measures for securing compliance with those standards. The aim should be to put such a hall-mark on goods manufactured in Great Britain that it will be recognised as a standard of excellence over the entire world and be recognised as securing such standard for any articles to which it is applied.

The next important question to decide is whether the National Electrical Proving House should draw up rules and regulations as well as make tests for compliance with standards set up. I am strongly of opinion that it should not. As regards articles in common use on consumers' installations I am of opinion that the Institution of Electrical Engineers should draw up rules in general terms as has been done in the wiring rules issued by that Institution. These rules (as is at present the case) should deal with the matter in general terms and should expressly avoid the indication of any particular methods whereby those general requirements are to be carried out. At this point the Engineering Standards Committee should step in and should draw up detailed specifications for the individual articles or methods to comply with the general rules issued by the Institution. The Engineering Standards Committee has no machinery for testing and therefore at this stage the work should be handed over to the British Testing Institution or, as I have proposed to call it, the "National Electrical Proving House," which body would carry out tests and make examination to ensure that the specifications were complied with both as regards design, dimensions and performance.

Lastly, in the event of investigations being necessary to determine laws affecting the design of apparatus, or to ascertain the properties of materials, or generally to obtain scientific or engineering data, the National Physical Laboratory should undertake the work and carry out the necessary experiments.

There would thus be a complete chain, with existing institutions carrying out each its proper work, and the National Electrical Proving House filling a gap which unquestionably now exists and which none of the other institutions can properly fill. There would thus be no overlapping or duplication and each body would be strengthened.

The third point to consider is whether the National Electrical Proving House should test for type only or whether it should attempt to carry out an inspection of every individual article supplied. Such a detailed inspection if it is not to be far worse than useless (as it would be if it engendered a false sense of security) must be carried out on the lines of Government overseeing. This would mean an enormous staff of well paid overseers, and, in addition to the costliness of the staff, there would be the interference with manufacturers and the inconvenience entailed on them which would unquestionably represent a very substantial augmentation of the cost of production. In my opinion, although the detailed inspection during manufacture of plant and apparatus by independent overseers unquestionably gives the best guarantee for efficient construction, it would constitute an intolerable burden on the electrical industry if enforced for all manufactured goods. Although the American Bureau professes to inspect, it does not do so in anything like the effectual manner above indicated. It relies largely upon good faith of manufacturers, upon their unwillingness to risk being struck off the list of approved manufacturers and on spasmodic and unexpected actual inspection.

As regards the general scope of the Proving House, although fire offices would unquestionably be largely interested, I do not think that it should by any means be confined to looking after apparatus from the fire hazard point of view only. It would, I am convinced, be invaluable to public supply engineers and to consultants.

Broadly, my idea of the field of operations of the Proving House is as follows:—

It should be prepared to test all electrical apparatus for compliance with certain standards. Primarily these standards should be those embodied in standard specifications of the Engineering Standards Committee, but I would not limit the tests to these standards, though the certificate or hall-mark or whatever form the stamp of approval might take would necessarily vary with the standard to which the articles had been tested. I should see no objection to the Proving House testing for compliance with the rules of any recognised authority. For example, the Electrical Manufacturers' Association might draw up rules of their own for articles not covered by institution rules or Engineering Standards Committee's specifications, so also might public supply engineers. Again, I should see no objection to the Proving House testing for compliance of British made goods with the rules of the American Bureau; this would go far to diminish the grievance under which British manufacturers now labour, *i.e.*, the goods could be tested in this country instead of having to be sent to Chicago. I am doubtful whether the Proving House should test to a specification supplied by an individual manufacturer for his own wares and consider that this point might be usefully discussed.

In addition to the main work of testing for type, which practically means the testing of newly prepared designs, I should see no objection to the Proving House undertaking the inspection of individual articles on request of purchasers or manufacturers and on the payment of suitable fees. This detailed overseeing would be work additional to its main functions and would not form an integral part of them.

I now pass on to the constitution of the governing body of the Proving House. On this will, I apprehend, depend almost entirely its utility to the industry. It is absolutely necessary that it should be thoroughly representative of every interest involved, that it should be entirely independent, and unquestionably above suspicion of bias or *mala fides*. The following interests should I think be represented in about the proportion indicated:—Board of Trade, 1; Admiralty, 1; War Office, 1; Post Office, 1; Office of Works, 1; Home Office, 1; Engineering Standards Committee, 2; National Physical Laboratory, 1; Institution of Electrical Engineers, 2; Incorporated Municipal Electrical Association, 2; Engineers of Public Supply Companies, 2; British Electrical and Allied Manufacturers' Association, 2; Cable Makers' Association, 1; Fire Offices, 2; Tramways Association, 1; Professional Staff of Technical and Engineering Colleges, 2; Representatives of large purchasers of apparatus such as railway companies, docks, etc., 2; Consulting Engineers, 2.

From the foregoing should be selected a small executive committee composed roughly as follows:—Representing Government Departments, 1; Municipal Authorities, 1; Public Supply Companies, 1; Fire Offices, 1; Manufacturers, 1; Consultants, 1; Institution of Electrical Engineers, 1.

The actual work of the Proving House should be under the direction of an electrical engineer of the highest standing and technical and scientific attainments, who should be paid a thoroughly adequate salary and devote his whole time to the work of the Proving House. Under him should be an adequate well paid staff.

All certificates should be granted on the recommendation of the technical paid director, but should not be issued unless and until approved by the executive committee, whose recommendations should be subject to the approval of the main governing body, though, for practical purposes, this latter body would probably delegate its powers largely to the executive committee.

The question of funds is a vitally important one and undoubtedly presents very considerable difficulties. In the early stages the Proving House could not hope to be self-supporting and would have to be subsidised by all the interests concerned, but later on, when it had attained the importance contemplated, the money received in fees would probably go far towards rendering it self-supporting.

The foregoing observations merely indicate the roughest and broadest possible outline of what I conceive would be the most useful and suitable form for the proposal to take. I have left untouched many questions that would have to be settled.

The question would probably arise as to whether the Proving House would examine foreign goods imported into this country.

The answer would probably be that such goods should be certified subject to a clear indication of their country of origin.

Yours very truly,

(*Signed*) C. H. WORDINGHAM.

The Training of the Instrument Maker.

My letter published on June 26th has elicited interesting replies from Mr. N. Ingleby and "Scientific Instrument" in your issues of the 3rd and 10th inst. The former questions whether the more thorough training I advocate would yield the greater benefit to the employer or to the employed—a matter hard to determine, and dependent on individual character and effort.

"Scientific Instrument" gives two reasons for the dearth of well-trained men in this branch, to which I might add emigration abroad or to other trades; his remark, however, as to the employment of incompetent bullies as foremen lacks confirmation in my own experience.

Your correspondent is undoubtedly correct in stating that a skilled instrument-maker is not paid high wages in comparison with those of unskilled workers; this is due not to huge profits made by the employers, but partly to the fact that there is no recognised standard of skill or training for the worker (the title "Scientific Instrument Maker" being adopted by many men of very poor attainments) and partly because, in many shops, piece-work rates are limited by tradition to one shilling per hour, even where a smart skilled workman could earn 25 per cent. more without undue effort and without revision of the piece-work rates. Many of our best firms have found that profits have been reduced to vanishing point by the enormous expense of

development work, such expense being often increased by the lack of interest or knowledge on the part of the workman, who prefers to "let the foreman do the thinking."

My firm opinion is that, with wider knowledge and more systematic training, a workman in this branch should obtain a status in the community that would be the envy of other skilled workers, and that his work would become thoroughly enjoyable to him.

Since writing my previous letter, I have had several communications from trade teachers and educational authorities, and from a number of firms who have kindly placed their experience of trade teaching at my disposal. I look forward to the time when an efficient trade school for instrument makers may be established, and in the meantime am proposing to attempt, during the coming autumn, a simple but definite scheme for the education of my apprentices during working hours, in trade drawing and arithmetic, the principles of workshop operations and the higher branches of workshop practice.

Thanking you for the publicity which you have given to the matter, which I hope may result in a systematic attempt to improve the efficiency and standing of the workers in this important branch of industry—

Robt. W. Paul.

London, N., *July 15th*, 1914.

Difficulties in Canada.

The notes which appear in your issue of June 19th *re* the desirability of British firms trading in the Dominion establishing a central organisation seem very opportune.

In addition to the points mentioned by your correspondent, there is another feature which might very well receive attention, and that is the question of general conditions. On nearly all municipal tenders in this country it is necessary for deposits to be made as a guarantee of good faith, these deposits varying from 5 per cent. to 25 per cent. of the total tender price. Where deposits are made by marked cheque, it is customary for the municipality to reserve the right to cash the cheque, usually without paying any interest on the money so held. Frequently this will mean that a municipality will be holding in this manner deposit cheques equal to the total value of the proposition for a considerable period.

The reason for this deposit system arises from the large number of comparatively unknown firms trading in the Dominion, many of whom are financially quite incapable of carrying through large or important contracts, but at the same time the scheme imposes an unnecessary burden on the really reliable firms whose very names should be sufficient guarantee of their good faith in submitting a tender. The B.E.A.M.A. and the I.E.E. have already done very good work in England in the way of establishing general conditions, and the writer believes that if the British manufacturers were organised in the manner you suggest, the chances of similarly improving trading conditions in the Dominion would be materially increased. At the present moment the Canadian manufacturers are inclined to adopt the attitude of being too important to discuss details such as this with individual foreign firms, but this attitude would not be justified if they were negotiating with a central body representing the foreign firms who are interested in trade in the Dominion.

The writer sincerely trusts that the B.E.A.M.A. will take an opportunity to consider the points which you have raised, and that we may shortly hear something of the results of such deliberations.

W. A. Coates.

Toronto, *July 10th*, 1914.

The Policy of the A.E.S.E.

Mr. Ebben's letter in your issue of the 10th gives interesting point to one of the suggestions put forward in my article in the previous issue, namely, the need for economic unions organised according to function.

Such unions are necessary for the following reasons :—

There are two methods of settling disputes, force and equity.

Civilisation is as yet so little advanced, that the latter mode is seldom applied, except in cases of dispute between individuals.

We forbid duelling, or fisticuffs, in the street, and we set the Law between disputants who obviously cannot come to blows, even if they would (a fight between, say, the respective shareholders of two rival railway companies would be of hilarious interest, but scarcely practicable).

We are slowly moving towards equity as between corporate bodies and even nations, but as matters are, "the good old rule, the simple plan," still obtains for the most part in human relations with, perhaps, some change in form. (Thus, the method of starvation is usually preferred to actual bloodshed as a means of coercion.)

Until the equity plan can be extended to cover industrial disputes, Mr. Ebben and his colleagues must be prepared to fight for the objects for which they are banded together.

Here I crave permission to offer a word of warning and suggestion.

There are thousands of well-trained and capable young men as yet wholly unorganised who, with a little special coaching, would be capable of replacing the members of the A.E.S.E. Mr. Ebben and his Council must be sure of the active support of the large majority of these men before aggressive operations can be undertaken with any likelihood of success.

Either the A.E.S.E. must widen its membership clauses or promote the formation of a sister union whose membership will embrace all possible unorganised competitors.

Of course there is also the employers' point of view.

C. Ashmore Baker.

London, S.W.

NEW ELECTRICAL DEVICES, FITTINGS AND PLANT.

High-Frequency Current Generator.

Dr. Lee de Forest has recently developed apparatus for generating in an incandescent lamp continuous high-frequency oscillations from a direct-current source, to be used as a transmitter for wireless telephony and telegraphy, as well as for numerous laboratory applications.

The small-sized 3½-volt Amplifier bulb, when properly excited, can generate alternating currents at frequencies from 60 to 1,000,000 per second, representing as much as a few hundredths of a watt, while with larger bulbs for 110 or 250-volt current two or three watts high-frequency power can be generated with only two or three hundred volts from small dry cells. We are informed

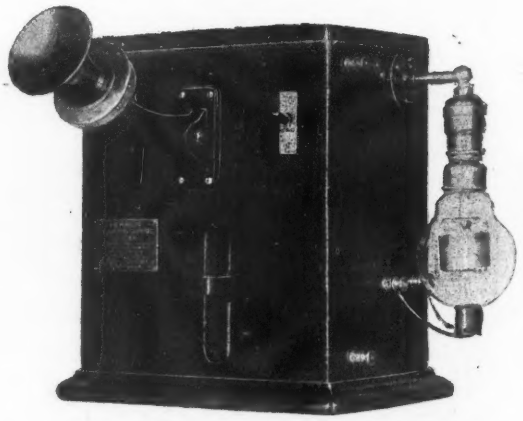

Fig. 1.—De Forest High-frequency Generator.

that with this form of transmitter and an ordinary solid-back or Berliner microphone, it is possible to telephone wirelessly for one to three miles, using an Audion as the receiving detector.

The new sytem is said to be remarkably constant and reliable in operation, and so simple, being perfectly free from adjustments, that where the operator is content to stay on one established wavelength and not to seek to switch around on various tunes, the merest tyro can operate the set.

Where storage battery supply is available, the oscillating Audion transmitter, being perfectly quiet, can serve equally well as the receiving Audion, both functions, transmitting and receiving, being then performed by the same bulb; a telepone receiver is kept connected in the wing-filament circuit as in the ordinary receiving Audion. In this case the same tuning circuits serve for transmitter and receiver. Then if both stations are using the same wave-length, the necessity for throwing over from talking to listening is avoided, and it is possible to talk both ways as over a line.

Complete de Forest radiotelephone sets utilising the oscillating Audion are already manufactured for sale, and the larger units will be placed on the market before long.

The "Marvel" Cooker.

Our illustration last week of the FIRELESS COOKER CO.'s oven showed the lowered door in the shape of a pan; this was an error due to an optical illusion, as the door is well lagged inside and is covered with an aluminium plate, which fits close against the flat face of the oven, when closed, thus making a heat-tight joint.

New Sealing-wax Heater.

A sealing-wax heater of a new pattern has been introduced by MESSRS. SIMPLEX CONDUITS, LTD., of Garrison Lane, Birmingham, for use in post offices, banks, &c. The wax container is of cast-iron,

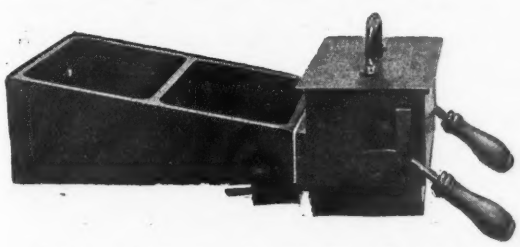

FIG. 2.—SEALING-WAX HEATER, WALL PATTERN.

and is supported from the wall by a rigid bracket arranged so that the container comes well over the table. There are two outlets for the wax, each operated independently by a lever handle. A heat insulating pad is interposed between the container and the bracket.

A Patent Automatic Furnace.

MESSRS. CLYDE EVAPORATORS, LTD., of 90, Mitchell Street, Glasgow, are introducing a new patent automatic furnace (Meikle's system) applicable to all classes of boilers. Reference to fig. 3 shows the furnace fitted to a water-tube boiler; it will be seen that fuel from the hopper is carried into the furnace by two horizontal screws, one on either side, and falls over sharply inclined firebars to a central ash trough in which an ash screw, with clinker breakers attached, revolves, for removing the ashes as made. Forced draught is conveyed in ducts to the underside of the firebars, and an auxiliary air supply is carried by means of passages in the ash trough to the back bridge and certain outlets over the coal feed screws.

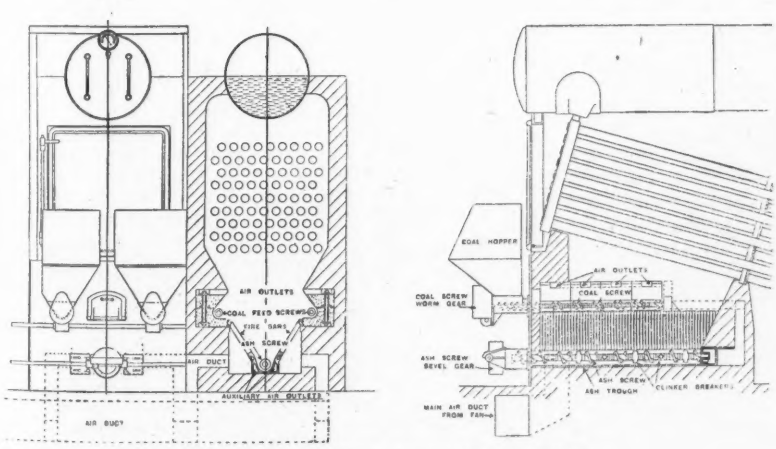

FIG. 3.—SCREW-FEED AUTOMATIC FURNACE.

Water is also supplied to the ash trough to moisten the ash and prevent dust being carried into the flues.

The coal screws are buried in the cold entering fuel, and it is claimed that coal feeding is self-adjusting, the fuel being automatically delivered to any point to compensate for rapid combustion. Some comparative combustion tests with a Babcock boiler, using hand and automatic firing, at a West of Scotland steel works are given, from which it would appear that during eight hours the results were:—Hand firing, 1,106 lb. fuel per hour; automatic firing, 756 lb.; water per hour, hand firing, 4,937 lb.; automatic firing, 4,911 lb. Evaporation from and at 212°, hand firing, 7·213 lb.; automatic firing, 10·75 lb. per lb. of fuel. The fuel used with the automatic furnace contained 15 per cent. ash, as against 11·8 per cent. ash in the other cases.

New Half-Watt Lamps.

Particulars have come to hand from the BRITISH THOMSON-HOUSTON CO., LTD., of 77, Upper Thames Street, E.C.; the GENERAL ELECTRIC CO, LTD., of 67, Queen Victoria Street, E.C.; MESSRS. SIEMENS BROS. DYNAMO WORKS, LTD., Tyssen Street, Dalston; the EDISON AND SWAN UNITED ELECTRIC LIGHT CO. LTD., of Ponder's End, Middlesex; the ELECTRICAL CO., LTD., of 122, Charing Cross Road, W.C., and MESSRS. DRAKE & GORHAM, LTD., 1, Felix Street, S.E., of reduced prices and new types of half-watt lamps. The smallest lamp, for 50-65 volts, takes 100 watts, and is rated at 200 C.P. Other new sizes are 200 watts, 400 C.P. for 50-65 and 100-130 volts; 300 watts, 600 C.P., for 100-130 volts;

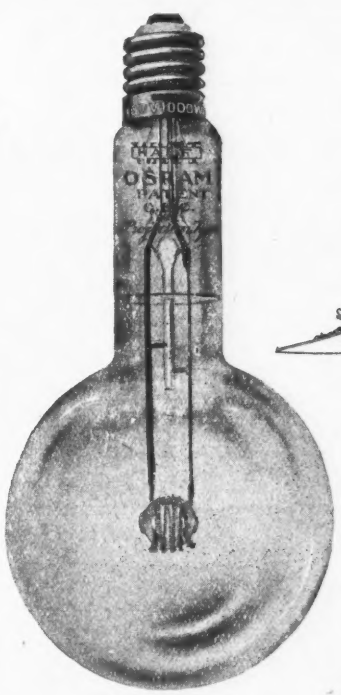

FIG. 4.—OSRAM HALF-WATT PROJECTION LAMP; 100 VOLTS 1,000 WATTS.

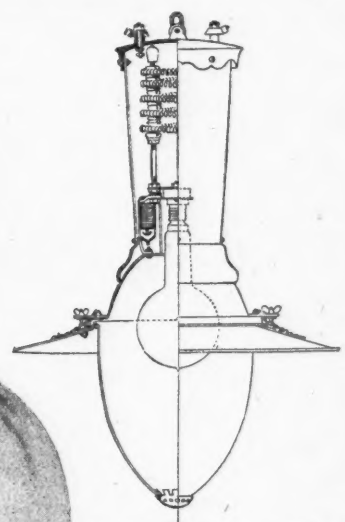

FIG. 5.—"BORO" HALF-WATT LANTERN OF THE G.E. CO.

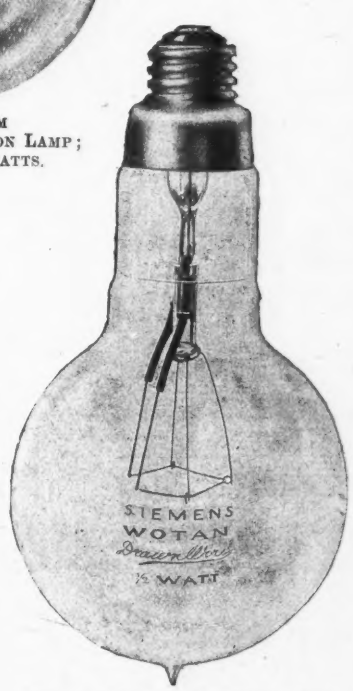

FIG. 6.—WOTAN HALF-WATT LAMP, 100 VOLTS, 200 WATTS, 400 C.P.

and 500 watts, 1,000 C.P., for 200-260 volts. These additions apply to the Mazda, Osram, Wotan, Ediswan and Nitra lamps, as illustrated in figs. 6 and 9. The price reductions came into force on July 20th. We understand that experience with the half-watt lamps shows that their average life is well over 1,000 hours.

The new types are called "projection" lamps, and are specially designed for use with parabolic or spherical reflectors and condenser lenses, as used in kinematographs, &c. The filament, therefore, is concentrated and arranged practically all in one

plane, as shown in the accompanying illustrations, figs. 4, 7 and 8. These are made for 100-130 volts, 300-1,500 watts, and 600-3,000 C.P., in two patterns, for vertical and horizontal use respectively.

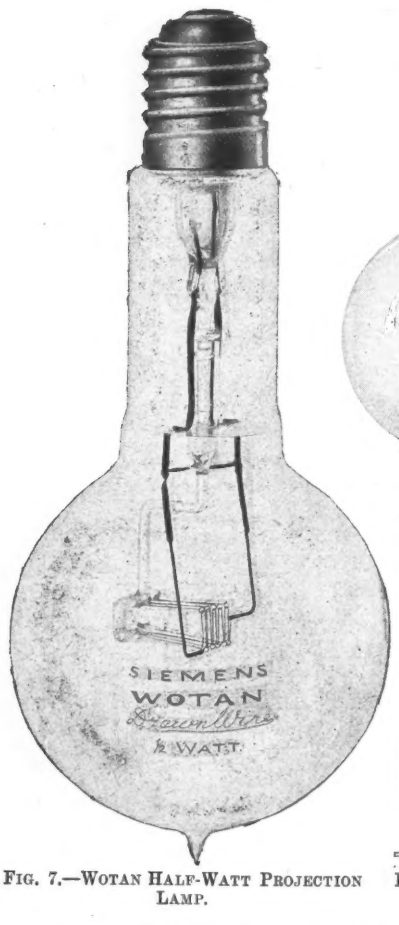

FIG. 7.—WOTAN HALF-WATT PROJECTION LAMP.

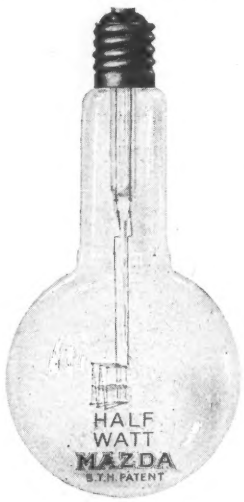

FIG. 8.—MAZDA HALF-WATT PROJECTOR LAMP.

FIG. 9.—MAZDA HALF-WATT LAMP, 200 C.P.

Fig. 5 shows the "Boro" half-watt lantern, which has been devised by the GENERAL ELECTRIC CO., LTD., to replace arc lamps for out-door lighting, fitted with an automatic cut-out and substitutional resistance for series running.

The "Panma" Fuseboard.

A new departure is marked by the introduction of the "Panma" fuseboard, by MESSRS. SIEMENS BROTHERS DYNAMO WORKS, LTD., of 38, Upper Thames Street, E.C., inasmuch as a slate base is dispensed with, and the fuses, of the well-known "Zed" type, are attached directly to the bus-bars, as shown in fig. 10.

The bus-bars are supported on bridge pieces of special insulating material, with a teak dividing fillet between the poles, and

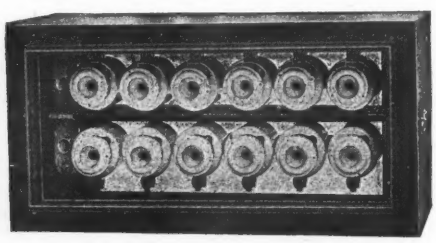

FIG. 10.—"PANMA" FUSEBOARD.

the terminals are arranged so as to facilitate the wiring. The fuses are enclosed in a teak case fitted with a hinged glazed lid, and are made up in boards of 2 to 12 ways, at prices which compare favourably with those of ordinary boards.

To introduce these fuseboards a special bonus system is offered, to contractors only; the system is novel and ingenious, consisting in the immediate supply of free art quotation covers for estimates, inside which is a type-written letter from the contractor to the customer offering Zed fuses as an alternative to clip fuses. The bonus is granted on the number of Zed fuse fittings ordered during the six months commencing on August 1st, in the form of an open order for any goods sold by the company, at trade prices, and the conditions are simple and quite the reverse of onerous. Particulars can be had from the company, and should interest wiring contractors.

PARLIAMENTARY.

Electrification of the Brighton Line.

A SELECT Committee of the House of Commons, under the chairmanship of Mr. Rupert Gwynne, last week considered a Bill promoted by the London, Brighton and South Coast Railway Co., under which powers were sought further to extend their electrical supply.

MR. FREEMAN, K.C., in opening the case, reminded the Committee that the promoters had for some time been electrifying their suburban lines, and they now desired to complete the scheme as far as Coulsdon on the main line and to Cheam on the Portsmouth section. So far they had been taking their supply from the London Electric Supply Corporation, and naturally, with the extension of the scheme, they would require a great deal more power. Before they decided on the extension, it was important that they should be sure of their supply, and they proposed to enter into contracts for that purpose. The Croydon Corporation, who possessed an electric lighting order, were opposing the Bill on the ground that it was not right that the company should be allowed to take power from anybody but themselves within their area. He asked the Committee to say that there were no grounds on which such opposition could be successful.

MR. W. FORBES, general manager of the company, said that at present they were paying the Croydon Corporation between £700 and £800 a year for electricity for certain of their goods yards and sidings.

Replying to the HON. J. D. FITZGERALD, who appeared for the Croydon Corporation, the WITNESS said that if the company were to make any progress with their electrification scheme, it was essential that they should take their power from one company in order that they might get it at the cheapest possible rate.

After further evidence, the Committee passed the preamble of the Bill, subject to the insertion of a clause that the company should use and not sell, and that they should use the current brought from outside the borough area solely for the purpose of the railway undertaking proper—traction, and station and goods yards lighting.

North-Eastern Railway Bill.

THIS Bill, which has already passed the House of Lords, came before a Committee of the House of Commons, presided over by Mr. R. Gwynne, on July 15th and 16th. Mr. Talbot, K.C., explained that originally there were 16 petitioners against the Bill, but all the opposition had been withdrawn except that of the Duke of Northumberland, who objected to the widening of the line from Killingworth and Forest Hall and Longbenton. The company had introduced a service of electrical traction in Newcastle and the neighbourhood, and the object of the widening was to give an electrical service from Beeston up to Killingworth. Mr. Benton explained the position of the petitioner in regard to his wayleaves, and said that his Grace was under a complete misapprehension as to the effect of the Bill, as it could not harm him in any way.

The CHAIRMAN asked what objection there could be to giving a clause to secure to the Duke of Northumberland the same terms as he had secured in a previous Bill.

MR. TALBOT explained that the only reason was that the promoters did not want a useless enactment in the Bill.

Evidence having been given in support of the Bill, MR. RAM, K.C., who appeared for the Duke of Northumberland, called MR. C. G. MAY, solicitor, who stated that the Duke gave his land for the purpose of the railway, and the only return he got for it was in wayleaves.

The Committee found the preamble of the Bill proved, and the CHAIRMAN said they thought the chance of the Duke of Northumberland being injuriously affected was so remote that they did not think a protective clause was necessary. At the same time they did not wish their decision to be in any way prejudicial to the Duke in any further application made for the extension of that particular line.

Walsall Corporation Tramways.—This Bill, which seeks powers with regard to an extension of the tramways, trolley vehicles, and motor-omnibuses in the borough, came before a Select Committee of the House of Lords last week, the Duke of Bedford in the chair. When the Bill was before the Commons it was opposed by the County Councils of Walsall and Cannock on the question of road contribution. Mr. Fitzgerald, K.C., for the Corporation, announced that the parties had now come to terms on the point, and the Bill was ordered for report and third reading.

Third Readings.—In the House of Commons on July 14th, the Hightown Gas and Electricity Bill, and on July 16th the Shropshire, Worcestershire and Staffordshire Electric Power Bill and the Yorkshire Electric Power Bill, were read a third time.

In the House of Lords on July 20th the London United Tramways Bill was read a third time.

In the House of Commons on July 15th, the Lords' amendments to Deal and Walmer Gas and Electricity Bill were agreed to.

LEGAL.

SENGHENYDD DISASTER.

POLICE Court proceedings taken by the Home Office against the manager and owners of Senghenydd Colliery, where 439 lives were lost in the disastrous explosion last October, concluded at Caerphilly on Saturday, when the magistrates delivered judgment. There were 17 charges against Mr. Edward Shaw, the manager, but these were reduced.

The magistrates imposed a fine of £2 for not appointing in writing a competent person to examine the safety lamps on the surface; a similar amount for not appointing in writing a competent person to unlock the safety lamps; and for not entering in the book the readings of the barometer, £5; for not providing a contrivance for the immediate reversal of the air, £10; for not causing to be made a report as to the conditions of the roads in regard to coal dust, £5. They also imposed five guineas costs on each of the convictions.

All the other summonses were dismissed, including also four summonses against the company. These dealt with alleged non-appointment in writing of an electrician and not systematically clearing road, roof, and sides of coal dust.

The evidence in this case, the magistrates said, was most conflicting, but they thought that the management had done everything practicable to prevent accumulation of coal dust. They also felt justified in dismissing the cases regarding the alleged use of safety lamps not of an approved type; also as to measurement of air on main current, as such regulations had only come into operation in the month prior to the explosion.—*Standard.*

WORKMEN'S COMPENSATION.

IN the West London County Court, on Friday last, application was made to his Honour Sir W. Lucius Selfe, for an award under the Workmen's Compensation Act, in favour of Mary Ann Sparks, 17 years of age, living at 41, Testerton Street, North Kensington, who had been employed by the Robertson Electric Lamp Co. The girl, it appeared, entered the respondents' factory at Brook Green in January, and was put to lamp cleaning. In April she was turned to cutting glass for the filaments, and while engaged in this she cut the index finger of her right hand, and this becoming bent, she was unable to work. It was proved in evidence that she earned more at "light" work than at the work she had been set to do. Witnesses deposed that cut fingers were quite common in this section of the works, and were seldom accounted serious. In May, Sparks was, with others, discharged through slackness of work, and she now claimed compensation. Asked why she was troubling about her finger, she replied that a relative told her she ought to get some recompense for the injury. His Honour awarded the girl £3 8s. compensation, with £3 3s. costs.

OSRAM LAMP WORKS, LTD., *v.* POPE'S ELECTRIC LAMP CO., LTD.

APPLICATION was made to Mr. Justice Joyce, in the Chancery Division, that a procedure summons in this action might be heard in open Court.

COUNSEL said the application was made with the consent of both parties.

His LORDSHIP acceded to the application, but said it must not be taken that the summons would be heard by him this side of the Long Vacation.

TRAMWAY ACCIDENT CLAIM.

A SETTLEMENT has been effected in the Court of Session action by a Dumbarton woman, who sued the Dumbarton Burgh and County Tramways Co., Ltd., for £1,000 damages for injuries. Fault was denied by the defenders, who have now paid the pursuer £250 in full settlement of her claim.

Copper.—The position at mid-month, to judge by the statistics tabulated by Messrs. H. R. Merton & Co., has not changed much in quantities of copper in visible and other supplies, though the price has made an appreciable advance. On the fortnight ending July 15th, 1914, English supplies had increased 1,238 tons. Total European supplies, however, owing principally to withdrawals from Rotterdam, and smaller quantities afloat, shows a decrease of 515 tons. Supplies during the fortnight have been low from North America, up to the average from Spain, slightly under from Australia and Chile. Total deliveries, at 18,678 tons, do not look very busy.

American visible supplies, as published by the American Producers' Association, had increased considerably during June, 9,718 tons being added during the month. The world's visible supplies for the end of June thus totalled 80,642 tons, the highest figure since March, 1913, and double that of last October.

The Channel Tunnel.—On June 29th an address was given by Lord Sydenham of Combe before a meeting of members of Parliament, convened by the House of Commons Channel Tunnel Committee, on the military aspect of the question. His views, and those of other speakers, were entirely opposed to the suggestion that the Tunnel would in any way weaken the defences of this country.

BUSINESS NOTES.

Consular Notes. — MANCHURIA. — The American Consul at Dairen reports that the South Manchuria Railway maintains electric lighting plants at Dairen, Mukden, Changchun, Antung and Liaoyang, and holds a controlling interest in the lighting plant at Newchang, which is operated in connection with the waterworks establishment at that port. All of these institutions seem to be giving fair business returns. Supplementary equipment, increasing the capacity by 1,500 KW., has recently been added to the Dairen plant. The capacity of the lighting establishments at Antung and Changchun has also been increased, and an additional generator will be installed at Liaoyang. The construction of an electric tramway, and the enlargement of the railway lighting plant at Mukden, have also been discussed. Recent statistics of lighting plants at main points along the railway give the number of households in which current has been installed as follows:—Dairen, 6,600; Mukden, 1,200; Changchun, 1,200; and Antung, 1,250. Meters are installed only where five or more lamps are in use, and the figures show that 32,000 lamps are supplied by meter in Dairen; 2,300 at Mukden; 3,400 at Changchun; and 2,600 at Antung. Lamps supplied by monthly contract number 16,000 at Dairen; 4,500 at Mukden; 3,800 at Changchun; and 3,600 at Antung.

RUSSIA.—The Russian Ministry of Communications has formulated a proposal for legislation with reference to the utilisation of water-powers, of which the following are the chief provisions:—(1) The right to utilise water-power is reserved to the State, which may either develop the power itself for the general well-being, or may grant concessions for its use in the interests of the development of certain industries; (2) this right cannot be passed to private undertakings in perpetuity as private property, but the concession must be of a terminable character, which will admit of the revision as may seem necessary, both of the terms under which the concession is let and of the purposes for which it is used; (3) should the utilisation of water-power acquire a State or public importance, the right is to be reserved to set aside all kinds of utilisation of this power of a private character in favour of public use; (4) the development of water-power must remain under Government supervision with the right to waive the concession in case of misuse or of developments of a monopolistic nature, so that the further utilisation of the water-power may pass to the Government for the remainder of the period of the concession, always provided that due compensation is made to the concessionaires concerned.

GREECE.—The British Consul for the Piræus reports that the commercial importance of the port of the Piræus has greatly increased and will continue to do so. Although the war, which cost Greece £15,179,000, has greatly affected the commercial prosperity of the country in general, the trade and industry of the Piræus has not suffered to any great extent. There is a great activity in all quarters to develop trade, and the acquisition by Greece of new territory will prove a powerful attraction for foreign and local capital to be used in the development of the agricultural and industrial resources of the country. Extension of existing railways and the construction of new lines will necessarily be undertaken, as well as irrigation works, the construction of roads, tramways and electric installations in many towns. The enlargement of the port of the Piræus, for which plans have already been made and submitted to the Government, will no doubt be carried out, as will also a large number of other important works which are under Government consideration. The agricultural districts in Macedonia, Epirus and the Islands offer openings for a good trade in machinery, flour mills, oil mills, and gas motors for working small plants, as well as in electric tramways and motor-omnibuses for carrying mails and passengers in districts where there are no railways, &c. The business that can be done in Greece is very important and of great value, and United Kingdom engineers and firms should do their utmost to secure at least part of these orders. Goods should be brought direct to the buyer's notice by advertisements, and by efficient representatives, who could explain the working of the machines and help buyers to obtain what is suited to their needs. Credit may be given against security to *bonâ-fide* agriculturists or proprietors of industrial establishments. United Kingdom machinery, implements, and all kinds of goods and articles have always received a marked preference in Greece, but the better methods adopted by foreign competitors, who have a thorough knowledge of trade conditions in Greece, tend to diminish the opportunities of United Kingdom firms. The outlook is good. Trade is already getting brisk, and when the political situation is definitely cleared up there can be little doubt that there will be better times for trade all round. The Greek market is worth much more attention than it gets from United Kingdom manufacturers, and it would be well worth their while to study the requirements and to cater for them more fully than they do at present. A boom is also expected in the building trade in the near future, and there will, consequently, be a good demand for building materials and general hardware.

The commission usually paid to agents in the Piræus districts for the sale of machinery, is from 5 to 10 per cent. The commission is due only on goods actually paid for, and applies to all orders, whether placed through the agent or direct. A local agent incurs no responsibility unless he acts contrary to instructions. The credit usually given by foreign firms through agents is from four to six months, and a discount of 2½ per cent. is usually allowed for cash payments. Prompt and punctual delivery of orders is essential; local merchants have the habit of waiting until the

last moment before giving orders, and, should there be any delay in delivery, acceptance is often refused. Commission business is in the hands of persons who are energetic, but who in some cases do not present the necessary guarantees of solvency. For this reason the Consul is of opinion that the following measures should be taken :— (1) Agents should only be entrusted with the collection of sums of money in special instances; (2) when orders are dispatched the firm should ask that the order be signed by the merchant who orders the goods, as otherwise it is easy for disputes to arise as to quality, &c.; (3) bills of lading should be sent through a bank to ensure delivery only on payment for the goods, or in exchange for a draft. While, as a general rule, these precautions should be taken, there are several commission agents in whom full confidence can be placed. Commercial travellers are not required to go through any formalities in order to be able legally to exercise their calling in Greece, nor are they required to take out a licence provided they come and go merely as bearers and receivers of orders. Agents of British firms, resident and trading in Greece, are, however, required to take out trade licences.

SWEDEN.—In a recent report the American Consul at Gothenburg comments on the development of hydro-electric power in Sweden, and gives certain details of works either under construction at the time of writing, or recently completed.

The city of Boras (Alfsborg County) has under construction a power station of 5,000 H.P. Lindesberg, a town in Orebro County, is building at Ringaby a power plant of 800 H.P. The city of Filipstad is constructing a lighting plant of 400 H.P. within the city itself.

A number of distribution plants are also being built. Director J. Nilsson is erecting a power station of 3,000 H.P. near Odensfors. It is to co-operate with the Lindkoping power and lighting station. The Eskilstuna Iron Manufactures Co. is building a power plant of 2,400 H.P. at Tunafors, and the Huskvarna Arms Manufacturing Co., of Huskvarna, is building one of 3,650 H.P. The plant at Dejefors is being enlarged, so that it will have a capacity of about 5,000 H.P., instead of its present capacity of 3,000 H.P. Besides the power plants mentioned, there are several smaller ones under construction in the country.

At many places extensions of electric plants have been made for the use of the wood-pulp, paper and iron industries. The large power plant at Bullerfors, belonging to Stora Kopparbergs Aktiebolag, was finished in 1910. In 1913 the last machinery fixtures were installed, giving the station a capacity of 30,000 H.P., of which the largest portion is used for iron smelting at Domnarfvet.

The Uddeholms Aktiebolag has also finished its power plant of 23,000 H.P. at Forshult, on the River Klaralven. It is to be used for the same purpose as that at Bullerfors. The Uddeholm Co. has also commenced the construction work on a power plant in the Uva River, likewise intended for the electric production of pig-iron. Kockums Jarnverks Aktiebolag is extending its hydroelectric power plant in the Ronneby River, so that the stations at Kallinge and Ronneby will have increased capacity. The Jaders Iron Works are building a power plant of 600 H.P. on the Arboga River, partly for factory use and partly for distribution, and a large enterprise in this line is being planned by the Arboga machine shops (Arboga Mekaniska Verkstader).

The power plants for the mining industry were increased considerably during 1913. The Guldsmedshytte Aktiebolag is building two power stations at Blankafors and Rockesholm, on the River Svartalfven, each of 2,100 H.P., and Riddarhytte Aktiebolag is building one at Gislarbo (Wastmanland County) with a capacity of 1,500 H.P. In the neighbourhood of Ludvika two power stations of 650 and 220 H.P. are under construction for Aktiebolaget Ludvika Bruksagare. Nora Bergslags Grufvor are building dams at Rastalfskvarn to secure 550 H.P. from the waterfall there. Finally, it may be mentioned that the Norberg mines received power from the Kolback River, and Virsbo Aktiebolag from Norsbo. These stations are of 900 H.P., as is also that of Ramnas Aktiebolag at Seglingsberg.

The paper and pulp mills have been compelled to make new arrangements by reason of increased demand for power. The Klippan Paper Mills are rebuilding their power plants, so that the station at Klippan will have a capacity of 875 H.P., and that at Fermsallen 500 H.P. In the same manner the power plant at Havrestrom is enlarged by 2,000 H.P. In Norrland a new power station is under construction for this industry. The Gidea and Husum Companies built a station of 2,500 H.P. in Gide River, at Gidea, which is to furnish power to the Hornefors Pulp Mill.

Catalogues and Lists.—MESSRS. A. EMANUEL & SONS, LTD., Phœnix Works, Speakingstile Walk, Birmingham.—Card showing their patent adjustable pendant which "stops where you push it."

MESSRS. TAYLOR, TAYLOR & HOBSON, LTD., Stoughton Street Works, Leicester.—24-page catalogue of engraving machines describing three different types of machine for engraving letters, figures, and designs upon metals and other materials. The machines shown are (1) for general work; (2) for large plate work; (3) for automobile or cycle tire moulds, gun mountings, &c.

MESSRS. JOHN WHITE, St. John, N.B., Canada.—Illustrated folder describing and pricing the "Magnet" electric suction cleaner.

MESSRS. EDISON ACCUMULATORS, LTD., 2 and 3, Duke Street, Piccadilly, S.W.—Two small pamphlets: One, dealing with the prevention of overcharge of storage batteries, fully describes the Sangamo circuit-breaker; the other describes the Sangamo ampere-hour meters for electric vehicles—these are largely used in America for electric vehicles, also for train lighting and other service. The Edison Co. are sole agents in the British Isles for the Sangamo Electric Co.

THE EDISON & SWAN UNITED ELECTRIC LIGHT CO., LTD., Ponder's End.—Leaflet No. L 3,048 gives prices of Royal Ediswan drawn-wire traction lamps. We have also received an advance copy of a 32-page catalogue (third edition) of "Ediswan" electric heating and cooking apparatus. The contents include descriptive particulars, illustrations, and prices of boiling pots and glue pots, saucepans, stewpans, and urns, "Eadisk" cookers and hot-plates, "Hot-point" irons, Hosgood patent stoneware utensils, "Hotwynd" blowers, kettles, grills, ovens, porringers, Pygmy heaters, and so on.

MESSRS. WESTON & CO., 47, Minories, London, E.C.—Leaflet relating to grinding paste, its use, advantages and price.

I.T.C., LTD., 147/149, Great Portland Street, London, W.—Priced folder concerning automatic desk and other telephones.

THE BRITISH ALUMINIUM CO., LTD., 109, Queen Victoria Street, London, E.C.—Illustrated lists relating to aluminium castings and tread plate; also a 32-page pocket pamphlet illustrating a number of applications of aluminium in the motor-car, electrical, gas and other industries.

MESSRS. FELD BROS. & CO., LTD., 25, Budge Row, London, E.C. Priced leaflets as follows:—No. 253, "Gnom" connectors and insulated screw eyes; 254, "Goliath" holders; 255, aluminium illumination strip holder; 256, push-bar holder; and 257, micanite in sheets.

THE GENERAL ELECTRIC CO., LTD., 67, Queen Victoria Street, London, E.C.—To aid contractors in securing orders for "Freezor" fans, the company have designed a neat folder with space for overprinting contractors' names and addresses. The folder points out the value of the fans in preventing stuffiness in offices, keeping restaurants cool and pleasant, shops wholesome, and private houses fresh. New Bulletin, No. 9, of 56 pages, contains full information regarding "Witton" rotary converters, with pictures of plant supplied to public and other supply systems. The different sections contain the following:—Standard specification for rotary converters, general principles of ditto, control of ditto, methods of starting and self-synchronising rotaries, and rotary converter sub-stations.

THE NAYLOR BATTERY CO., LTD., Lammermoor Road, Balham, London, S.W.—16-page catalogue giving illustrations and particulars, also prices, dimensions, weights, &c., of Naylor accumulators for car lighting, ignition and starting, electric vehicle and launch service. In the traction section the "A," "B" and "C" types are detailed.

MESSRS. MATTHEWS & YATES, LTD., Cyclone Works, Swinton, near Manchester.—8-page illustrated booklet concerning "Cyclone" electric fans, electric blowers and exhausters, "Cyclone" motors, &c.

MESSRS. STEINBACH & HOHN, Mansion House Chambers, London, E.C.—Price leaflet of porcelain fittings and weatherproof enamelled fittings for half-watt lamp lighting.

Trade Announcements.—MESSRS. MORRIS & LISTER (LONDON), LTD., have now taken over the sole representation for London and the South of England for Messrs. Mickelwright, Ltd., of Alperton, and all inquiries, &c., should now be sent to them at 3 and 4, Palace Chambers, Bridge Street, Westminster, S.W.

MR. A. J. HODGSON, late joint general manager and previously works manager with Messrs. Crompton & Co., Ltd., has joined the business which has been carried on by Mr. W. Hotton for some years. They will in future trade as electrical, gas and mechanical engineers and contractors under the style of Hotton & Hodgson, Ltd., 71, Southwark Street, S.E.

MR. J. G. BOMFORD, of Shakespeare Chambers, Stratford-on-Avon, concerning whose business a notice appeared here last week, invites manufacturers and factors to forward catalogues.

THE RELIANCE ELECTRICAL WIRE CO. have removed to larger premises at Spitalfields Works, 38 and 40, Curtain Road, London, E.C., where they have had a new electrically-driven factory specially constructed and equipped. Telephone No. unaltered (9212 London Wall).

The CRYPTO ELECTRICAL CO. have now removed their office from Bermondsey Street to their new works, Acton Lane, Willesden (five minutes' walk from Harlesden Station, L.N.W. Rly.). Telephone Nos. 233, 2240, and 2241 Willesden.

MR. CHARLES H. JEFFCOAT ("Lamlok" specialities) has removed to 18, Ranelagh Gardens, Chiswick.

MESSRS. LEDWARD & BECKETT, LTD., have removed their offices to Broadway Chambers, Westminster, S.W.

Bankruptcy Proceedings.—W. R. WEDGE, electrical engineer, The Arcade, Northampton.—The adjourned examination of this debtor was fixed to take place at the County Hall, Northampton, on July 14th, but when the debtor's name was called, he did not appear. The Official Receiver (Mr. A. Ewen) stated that he had received another letter from the debtor, from which he gathered that he would like another opportunity of appearing. He was suffering from disablement, and had been advised by a doctor to undergo an operation. The case was, therefore, again adjourned.

Liquidations.—THE "DAC" ACCUMULATOR SYNDICATE, LTD.—This company is winding up voluntarily for the purpose of reconstruction, with Mr. H. C. Bound, of 61 and 62, Lincoln's Inn Fields, W.C., as liquidator. A new company is to be registered under the same name.

THE RAPID LIGHT CONTROLLING SYNDICATE, LTD.—This company is winding up voluntarily with Mr. R. H. Pritchard as liquidator. A meeting of creditors is called for July 27th, at 7, Victoria Street, S.W

Electrical Exhibition at Wolverhampton.—An Electrical Exhibition, promoted by the Corporation Electricity Department and held in the West Park on the occasion of the Annual Floral Fête, has just been concluded at Wolverhampton.

In a marquee, covering an area of 13,300 sq. ft., a substantial timber model house was built by the department's staff, with seven rooms, which were tastefully furnished and equipped with samples of electric heaters, cookers and other domestic apparatus.

There were some exhibits by local firms, the principal of which was the well-equipped stall of Messrs. Read, electrical contractors, and the Electricity Department undertook to exhibit apparatus for outside firms, amongst which were :—

Meters, switchgear and fuse boxes, from the Reason Manufacturing Co.

Vacuum cleaners, motors and cookers, from Messrs. Gillespie and Beales.

Electric drills, from the Westminster Tool Co.

Electric tube cleaners, from Mr. F. Gilman, Birmingham.

Ventilating fans and fittings, from Messrs. Veritys, Ltd.

Heaters and cookers, from the Credenda Co.

Kettles, irons, &c., from the Electrical Co.

Table utensils, from the Brompton and Kensington Accessories Co.

Water-heating apparatus, from the British Electric Heaters Co., Glasgow.

Electric vehicles, from Messrs. Mossay & Co.

Electric cookers, from Messrs. Ferranti, Ltd.

Motors, from the Electric Construction Co.

These firms each had a representative present throughout the Exhibition.

A large assortment of modern electric cooking stoves was on view and in use, including the Tricity, Carron, Ferranti, Eclipse and Credenda types. The food required for the feeding of the staff, representatives and exhibitors, numbering about 40 persons, was cooked at the Exhibition, and a separate tent was used for cooking demonstrations.

No charge was made for admission to the Exhibition, and the total attendance numbered over 50,000 persons.

The Exhibition proved an admirable opportunity for the borough electrical engineer, Mr. S. T. Allen, to get directly into touch with a large number of would-be consumers.

"C. and H." Convention.—Birmingham, which was this year the scene of the I.M.E.A. Convention, had a second Electrical Convention last week, when MESSRS. CHAMBERLAIN AND HOOKHAM held what was also *their* second Convention. While the numbers were necessarily smaller, there were otherwise all the usual features of a convention, including the informal "gathering of the clans" in the hotel smoke-room the night before, papers and discussions, and feasting. The members of the selling staff—Messrs. Bland, Frost, Selley, Sleath, Rouse and Sharp—strengthened by colleagues from overseas—Messrs. Hogarth, from Germany; Lines, from Canada; Munroe, from South America; Carter, who has just returned from a long trip through the East; and Bennett, who is just going out there—met all the heads of indoor departments, and each side told the other what it thought of them. Mr. John Chamberlain umpired, assisted by Mr. Hookham. Mr. Hatfield, so well known for his work on electrolytic meters, was present, and delivered an interesting lecture, illustrated by very large drawings, on the Holden hydrogen meter, which he has been developing for Messrs. Chamberlain & Hookham for the last two years or more. We understand that there seems a likelihood of an important development with this meter. Mr. Griesbach also attended the meeting, and demonstrated the new prepayment meter which he has recently invented, and which is about to be placed on the market by the firm. At the luncheon, to which Mr. Chamberlain invited the party at the Imperial Hotel, Mr. Chamberlain referred to the many other members of the staff who were carrying on the firm's work in various parts of the world, and who were unable to be present that day. Advantage was taken of the opportunity to present a canteen of cutlery to Mr. Lines, who has just entered the "Holy House of Bondage." In the evening Mr. and Mrs. Lines were entertained to dinner at the Queen's Hotel by the other members of the party.

Book Notices.—*Universal Directory of Railway Officials*, 1914. London: Directory Publishing Co., Ltd. 10s.—This annual publication has now reached its 20th year. For all who want information, from time to time, regarding the railway systems of the world, and their *personnel*, it is of great value. As usual, it has been compiled from official sources by Mr. S. R. Blundstone, editor of the *Railway Engineer*. Its personal index of railway officials occupies nearly 200 pages, and more than double that space is devoted to the details of systems placed alphabetically in different geographical sections.

"Electric Traction." By L. Calisch. London: The Locomotive Publishing Co., Ltd. Price 2s. net.

Electric Sign Lamps.—H.M. Consul-General at New York (Sir C. W. Bennett, C.I.E.) reports that a firm of electric sign manufacturers in New Jersey desires to get into communication with United Kingdom makers of miniature metal-filament lamps, of which it is desired to purchase about 100,000. The lamps are to consume about ¼ ampere at 4½ volts and to have a useful life of 1,000 hours.—*Board of Trade Journal.*

Strike.—A number of workmen employed by the BRITISH INSULATED AND HELSBY CABLES, LTD., downed tools on July 15th, and on the following day part of the works was closed by the firm until further notice.

Holidays.—The works of the CABLE ACCESSORIES CO., LTD., Tividale, Tipton, will be closed from Saturday, August 1st, until Monday morning August 10th, for the annual holidays.

MESSRS. A. P. LUNDBERG & SONS, of Liverpool Road, N., announce the closing of their works from July 31st to August 10th, for the annual holidays.

The works of the LONDON ELECTRIC FIRM will be closed on Saturday, August 1st, and reopened on Monday, August 10th, for the annual holiday. A small staff will attend to urgent business.

MESSRS. J. H. TUCKER & CO., of Birmingham, announce that their works will be closed the whole of August Bank Holiday week. The offices and warehouses will be reopened on Wednesday, and will deal as far as possible with orders for stock lines. Urgent matters should be notified at once.

The works of MESSRS. H. T. BOOTHROYD, LTD., Bootle, Liverpool, will be closed for the annual holiday on Friday, July 31st, and will re-open on Monday, August 10th. Only urgent correspondence will be dealt with.

MESSRS. COX-WALKERS, LTD., Darlington, announce that their works will be closed from Saturday, August 1st, until Monday, August 10th, 1914, for the annual holiday. Only matters of urgency will be dealt with during that period.

The works of the LIVERPOOL ELECTRIC CABLE CO., LTD., will be closed from Saturday, August 1st, until Monday morning, Aug. 10th.

MESSRS. A. SEAGE & CO., of Hammersmith, announce the closing of their works and offices from August 1st to 10th for the annual holidays.

The WESTERN ELECTRIC CO.'S works at North Woolwich will be closed for the holidays from August 1st to August 10th, and only the most urgent matters will be dealt with.

The works of MESSRS. MUIRHEAD & CO., LTD., Elmers End, will be closed from July 30th (evening) until August 10th.

Annual Outings.—The annual excursion of the employés of the Hull Corporation Electricity Department took place last week, when the party visited Bridlington and Flamborough. From Bridlington the visitors went to Flamborough by motor char-à-banc, and after lunch at the Dog and Duck Hotel, the party investigated the wild beauties of the North Landing. Sports followed. Dinner was served in the evening, and a hearty vote of thanks was accorded the chairman of the Electricity Committee (Alderman Hanger), the vice-chairman (Councillor Pybus), and the secretary (Mr. W. Dyson), who had arranged the outing. Later the party returned to Bridlington, where free admission to the Prince's Parade was granted, and thence homewards to Hull.

The employés of MESSRS. FERRANTI, LTD., Hollinwood, recently went to Scarborough for their outing.

In exceptionally fine weather the annual picnic of the SYNCHRONOME CO., LTD., took place on Saturday last. The party, 30 in number, embarked at Windsor on the launch *Duchess*, and visited Quarry Woods, Marlow, Bispham Abbey and Temple Lock. Mr. Hope-Jones, in one of the speeches, spoke of the loyalty of the staff.

The annual outing of the ST. HELENS CABLE AND RUBBER CO.'S staff took place on July 17th, at Llandudno, the party numbering over 60. The dinner was presided over by Mr. J. H. C. Brooking, the general manager, who, in proposing the toast of "Prosperity to the Company," expressed his gratitude to the staff for working so ably during the past few years as to make a success of what was before then a very struggling concern.

The employés of MESSRS. D. H. BONNELLA & SON, LTD., held their annual outing on Saturday, July 18th, proceeding by rail and boat to Margate. The weather was all that could be desired, and a most enjoyable day was spent. Tea was served at the Albion Hotel. The managing director, Mr. A. J. Bonnella, who presided, expressed his pleasure at being present, and regretted the absence of both Mr. D. H. Bonnella and Mr. D. C. Bonnella, and referred to the continued progress made by the firm, which necessitated enlarged premises. He thanked all the employés for their co-operation which had contributed to this desirable state of affairs. The number of employés was considerably over 100, and that number would, he felt sure, with their continued co-operation, soon be increased. Mr. Farthing, Mr. Frost, and Mr. Burnett heads of machine, assembling and wood-working departments, accompanied the party.

The employés of the GUERNSEY ELECTRIC LIGHT AND POWER CO., LTD., went for their annual outing last Saturday week, a party of 45 going by way of St. Sampson's and Bordeaux Harbour to Fort Doyle, to inspect the Platte Fougère lighthouse station. Mr. Ferguson, the engineer, conducted the party round. A lobster tea was served at the Rockmount Hotel. Sports were indulged in on the sands, and a smoking concert followed in the evening, Mr. C. T. Westlake presiding.

The London Electric Railways Athletic Club held its second annual outing at Stamford Bridge on Saturday last.

Glasgow.—For the lighting of the Glasgow Royal Hospital for Sick Children, which was opened by the King last week, nearly 2,000 "Royal Ediswan" drawn-wire metal-filament lamps are in use.

Stoker Contracts.—We have received the following list of authorities for whom the UNDERFEED STOKER CO. has lately executed orders for stokers and other apparatus:—Edinburgh, St. Helens, Halifax, Ealing, Torquay, Tunbridge Wells, Sunderland, Maidstone, Dumfries, and Barrow-in-Furness Municipal Electricity Departments; Pernambuco Tramways; National Electric Supply Co., Preston; North-Eastern Railway, Hull.

The Next Motor Show.—The next Olympia motor show is to take place from November 6th to 14th, and it is said that practically all the space has been disposed of.

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LIGHTING and POWER NOTES.

Accrington.—YEAR'S WORKING.—Reporting on the work of the electricity department, Mr. Harold Gray, the borough electrical engineer, states that the gas plant has been kept as fully loaded as possible, turning out 4,099,221 units sold, while the steam plant has been used for the peak loads, producing 1,756,809 units. The fuel cost for the gas plant was 0·220d. per unit, and for steam 0·483d. per unit sold. Wages were respectively 0·126d. and 0·200d. The sale of sulphate of ammonia and tar resulted in a net income of £1,327, or 0·077d. per unit, though the sulphate plant was running for only 38 weeks. Oil, stores and repairs cost 0·069d. and 0·079d. per unit for gas and steam plant respectively, the works costs being 0·338d. for gas and 0·762d. per unit for steam, or 0·466d. per unit for both plants. The distribution system has been extended, and 204 new consumers have been connected—the largest number recorded in any one year; the increase was partly due to the popularity of the rateable value system of charging, which has been adopted by more than 10 per cent. of the consumers, who number 1,136. A chemical laboratory, rendered necessary by the use of Mond gas plant, has been very useful in testing fuel, bitumen, oils, &c. The adoption of the Norwich system has led to a great increase in the sales of heating and cooking appliances.

Aldershot.—NEW PLANT.—The Lighting Committee has recommended the U.D.C. to obtain tenders for a cooling tower at the electricity works, at an estimated cost of £400.

Belfast. — WORKHOUSE LIGHTING. — Messrs. John Woodside & Co., in a report on the scheme of the Selas Lighting Co. for lighting and heating the workhouse with electricity, state that the capital cost would be £22,308. The maintenance charges under the scheme would be £4,552 per annum, exclusive of loan charges, against £6,889 per annum at present. The Guardians have referred the matter to the Works Committee.

Blackburn.—GAS SCHEME HELD UP.—Sir Corbet Woodall, Governor of the Gas Light and Coke Co., recently reported to the Blackburn Gas Committee on the reconstruction and reorganisation of the gas works, and recommended the expenditure of over £25,000. The Special Committee, however, has hung up the scheme for the present, as it is considering an equally large expenditure in connection with the electricity undertaking, and both matters are to be referred to the full Council. A special report in connection with the projected electricity extension was prepared a few months ago.

Blyth.—OVERHEAD WIRES.—The U.D.C. has consented to the Northern Counties E.S. Co. erecting overhead wires in the district for the transmission of energy at 3,000 volts.

Burton-on-Trent.—LOAN SANCTION.—Without holding an inquiry, the L.G.B. has sanctioned the borrowing by the T.C. of £7,000 for electricity purposes.

The Constructional Engineering Co., which is establishing works in Wetmore Road, has applied to the Council for a large supply of electricity for power purposes.

Bury St. Edmunds.—FREE WIRING.—As a result of the decision of the T.C. to install electric light in houses on the free wiring system, over 50 applications have been received, and 12 houses are to be wired at once.

Canada.—The Cataract Power Co., Niagara Falls, has signed a 15-year contract with the city of Hamilton for lighting the city streets at an increased cost of $88,000 over the present price. The 600 arc lamps are being replaced by 7,000 nitrogen lamps. Sir Adam Beck, chairman of the Ontario Hydroelectric Commission, congratulated Hamilton on being the first city on the Continent of America to adopt this system of lighting.

The Winnipeg Electric Railway Co. has completed arrangements for the erection of a power station at Big Bonnet Falls, 70 miles north of Winnipeg. The plant will have a final capacity of 150,000 H.P., and will cost nearly $3,000,000. Only 60,000 H.P. will, however, be developed at first.

Chippenham.—STREET LIGHTING.—The T.C. has decided to have a report prepared as to the relative cost of lighting by electricity the street lamps now lighted by gas supplied through meters.

Clones.—PUBLIC LIGHTING.—The town is to be electrically lighted for three years by the Clones Electric Lighting Co. The scheme embraces 41 lamps of 500 to 4,000 C.P., the total candle-power being 47,900.

Cuddington.—PROPOSED E.L.—The Council recently appointed a Committee to confer with the South Metropolitan E.L. Co. on the question of a supply of electricity in the district.

Dublin.—LOAN SANCTION.—The L.G.B. has sanctioned the borrowing by the Corporation electric supply department of £77,800 for public lighting purposes. The proposed loan of £5,000 for the conversion of gas lighting to electricity has, with the consent of the Public Lighting Committee, been reduced to £2,500, and the matter is to be further considered in a year.

Durham County.—E.L. SCHEME.—A joint meeting of the Coxhoe, Cassop and Kelloe P.C.'s has decided to light various parishes with electricity. East Hetton, Kelloe, South View, St. Helen's Terrace, Quarrington Hill and Cassop are to be supplied by the owners of the East Hetton Colliery, and Bowburn, Tursdale, and other districts are to be supplied by Messrs. Ball Bros., Ltd.

Easington.—HOSPITAL HEATING.—The R.D.C. has appointed a Committee to consider the advisability of heating the hospital buildings with electricity.

East Grinstead.—PROPOSED E.L.—The U.D.C., after considering a report by Mr. J. B. Morgan, has decided to apply to the B. of T. for a prov. order for E.L. The capital outlay for the proposed scheme, which includes a refuse destructor, is estimated at £10,000.

Edinburgh.—LOAN SANCTION.—The T.C. has received the consent of the Secretary for Scotland to the borrowing of £220,000 for the extension of the electricity undertaking.

Glastonbury.—PROV. ORDER.—The T.C. has received a letter from Messrs. Christy Bros. & Co., of Chelmsford, notifying their intention of applying for an E.L. order for the town.

Goole.—DOCK EQUIPMENT.—The *Goole Times* gives particulars of recent improvements carried out by the Lancashire and Yorkshire Railway Co. The company has erected several new sheds and warehouses on the dock sides, all of which are equipped with the latest and most approved types of machinery operated by electric power. On the east side of the railway dock electrical overhead travelling cranes, fitted with underhung revolving jibs, of 1½ tons' lifting capacity, have been installed. These can lift direct from the ships' holds and deposit in the shed, or in wagons standing on the lines of railway at the far side of the shed. In addition there is one 3-ton ordinary electric overhead travelling crane without swing jib. Modern free-bollard electrical capstans are fixed alongside the lines to facilitate the movements of wagons. On the west side of the same dock, near Bridge Street, a two-storey warehouse was recently erected. The outside of the shed on the dockside is swept by two 3-ton electrical travelling jib cranes, whilst inside the shed there is one 1½-ton electrical overhead travelling crane. Four 1-ton electrical jiggers are fitted on the upper floor. Electrical capstans transfer wagons to and from the railway sidings. About 2 miles from Goole a spacious shed has been erected, and is fitted with a 1½-ton electric overhead travelling crane and electric capstans. On the west side of the railway dock the Railway Co. is building a modern workshop, stores and offices, for the marine engine department. The motive power in this place, together with that for the operation of the new electric plant and lighting, is being obtained from the Yorkshire Electric Power Co. to the extent of 500 H.P.

Great Yarmouth.—POLICE LAMPS.—The T.C. has decided to provide the police with 30 electric lamps, at a cost of £10 2s. 6d., with £28 10s. for a generator for recharging the batteries.

Guernsey.—ILLUMINATIONS.—At the fêtes in connection with the recent unveiling of the Victor Hugo statue, which was presented by the French Government, a very complete scheme of illuminations was arranged. Unfortunately heavy rain and wind somewhat spoiled the show so far as gas and candle lanterns were concerned, and we learn from the *Guernsey Advertiser* that "only electric illuminations were at all a success," while another writer in the same paper comes to the conclusion that gas illumination is obsolete. The Guernsey E.L. and P. Co. apparently made an excellent display, including a searchlight.

Hayle.—PROPOSED STREET LIGHTING.—The Cornwall E.P.S. Co. has informed the U.D.C. that it could install 63 street lamps in the district for £960, provided that wayleaves for overhead wires were granted, and that the company was permitted to fix wires for private supply on the same poles. The lamps would be of 50 C.P. each, and the charge for maintenance would be 30s. per lamp for 1,600 hours of lighting per annum. It is estimated that the Council will save £100 per annum if the scheme is adopted.

Holmfirth.—E.L. SCHEME.—The L.G.B. has intimated its willingness to give a favourable decision on the electricity scheme, provided the B. of T. will approve of the site of the generating station, and the proposed method of supply.

Japan.—Notwithstanding the frequent pledges of the Government gradually to abandon State enterprises, it is reported that the idea of nationalising all the water-power undertakings in Japan is gaining ground in official circles. The reason advanced for the new departure is that the nationalisation of the undertakings will remove all inconveniences to the Government in the execution of the waterway administration programme. The Waterway Department at present is not empowered to deal with the use of the rivers as a source of power, the result being that much of the work of the department is rendered futile. At present the law does not provide for the imposition of any burden on the power companies, who, while freely making use of the rivers, do not share the cost of their upkeep.

Keighley.—PROV. ORDER.—The Corporation has notified the R.D.C. of its intention to apply for a prov. order to supply electricity in the rural district, or some part thereof.

Kirkcaldy.—YEAR'S WORKING.—Although the output of the Corporation electricity department for the past year was greater than ever before, the net revenue showed a decrease of £174 compared with the previous year. The reduction is attributed to the high price of coal.

Litherland.—Prov. Order.—The U.D.C. having been informed that the Bootle T.C. intends applying for a prov. order for electric lighting in its district, has decided to take steps to obtain its own order. Permission has been granted for the Bootle T.C. to supply current to the premises of Messrs. Geo. Sturla and Son, Ltd., Linacre Road.

London.—L.C.C.—The L.C.C. has been recommended by its Finance Committee to sanction the borrowing of £3,500 by the Battersea B.C., for coal-conveying plant at the electricity works, and of £5,316 by the Islington B.C., for cooling towers at the electricity works, including £3,750 for plant and £1,566 for the site.

On October 28th, 1913, the L.C.C. sanctioned the borrowing by the Hackney B.C. of £56,748 for electricity purposes. A revised estimate, based on tenders received, and making a total of £60,000, has now been sanctioned by the L.C.C. The revised loan includes £2,716 for sites, £10,632 for buildings, £32,652 for mains, and £14,000 for plant.

Stepney.—The Electricity Committee has recommended the B.C. to take up a loan of £35,000, for which L.C.C. sanction has been obtained, for new plant at the Limehouse generating station.

The B. of T. has approved of the agreement for the bulk supply of electricity between the Stepney and Shoreditch B C.'s.

St. Pancras.—Annual Accounts.—The gross income of the Borough Council's electricity department for the year ended March 31st last was £93,483, an increase of £2,944 over the previous year. The net profit was £12,568, an increase of £1,883. The reserve fund now amounts to £44,033.

Shoreditch.—The Lighting Committee has recommended the B.C. to lay a main from Coronet Street to Scrutton Street, in connection with the supply of electricity to the premises of Messrs. Waterlow & Sons, at an estimated cost, including switchgear, of £1,350.

Llandudno.—Year's Working.—The receipts of the U.D.C.'s electricity undertaking for the year ended March 31st last increased by £105, and the expenditure by £467, over the previous year. The gross profit was £3,905, against £4,268, and the net profit was £462, a decrease of £319. The output increased by 34,846 units.

Lossiemouth.—Supply Inaugurated.—The electricity supply, which has been installed at a cost of £5,500, was switched on last week. The plant consists of two 50-B.H.P. suction gas engines, built by Messrs. Ruston, Proctor & Co., coupled to 25-kw. dynamos, supplied by Messrs. Johnson & Phillips, Ltd. The whole of the mains work was carried out by the Silvertown Co.

Mansfield.—Year's Working.—The profit on the past year's working of the Corporation electricity department amounted to £1,581, against £1,128 in the previous year, and it is proposed to allocate £800 to the relief of the rates.

The question of extending the electricity works has been referred to a sub-committee for consideration.

Midsomer Norton.—Prov. Order.—The Midsomer Norton and Radstock E.S. Co. has informed the U.D.C. that it intends applying to the B. of T. for a prov. order for E.L. within the Council's area.

Nelson (near Cardiff).—Proposed E.L.—The South Wales E.P.D. Co. is in correspondence with the Caerphilly U.D.C. respecting the public lighting of Nelson by electricity.

New Zealand.—The ratepayers of Wairoa have sanctioned a loan of £4,000 for the extension of the E.L. system.—*B. of T. Journal.*

North Bierley.—Workhouse Lighting.—The proposed lighting by electricity of the Union premises at Clayton having been approved by the L.G.B., the B. of G. has instructed Mr. T. Roles, of Bradford, to prepare a scheme.

Oldham.—Annual Report.—The report of the Corporation electricity department for the year ended March 25th last states that the gross revenue amounted to £49,608, and the gross expenditure to £26,533. After allowing for loan charges and expenditure on meters, the net profit was £1,995. The units sold numbered 7,058,801, an increase of 595,385 over the previous year. This total includes private lighting, 1,884,226, an increase of 192,366; power, 1,854,596, an increase of 546,499; street lighting, 28,371, an increase of 125; and traction, 3,291,608, a decrease of 143,605. The total receipts from the sale of energy amounted to £48,710, an increase of £2,838, including private lighting, £20,742, an increase of £1,887; power, £7,172, an increase of £1,856; street lighting, £233; and traction, £20,564, a decrease of £906. The amount in reserve now totals £7,435. The capital expenditure during the year was £16,838. Works costs amounted to 0·423d. per unit, a decrease of 0·036d. compared with the previous year, and the total revenue costs were 0·898d. per unit, a decrease of 0·043d. per unit. The maximum demand during the year, exclusive of traction, was 2,424 kw., against 2,136 kw., and for traction 1,430 kw., against 1,480 kw. During the year the H.T. mains were extended by 7,842 yd., and the L.T. mains by 6,078 yd. The charges for energy have remained unaltered.

Portaferry.—Proposed E.L.—At a public meeting, held on July 10th, a Committee was appointed to consider an E.L. scheme for the town. Estimates were submitted by Messrs. W. Coates & Son and Messrs. Thomas Somerset & Co., who generate electricity in the town.

Portsmouth.—Proposed Loan.—The E.L. Committee is about to apply to the L.G.B. for a loan of £24,000, for mains and other work during the next three years.

Price Reduction.—The charge for energy for power has been reduced by the T.C. to 1d. per unit for the first 20,000 units, and ½d. per unit beyond.

Radstock.—Prov. Order.—Messrs. Seymour Williams and Co., of Bristol, have notified the U.D.C. of their intention to apply for a prov. order for E.L. within its area.

Ruthin.—The estimate of Messrs. Edwards & Armstrong for wiring and fitting the Town Hall and fire station for E.L. has been submitted, for a report, to Mr. Smith, electrical engineer, Nottingham, who is also to prepare a specification for street lighting.

Sherborne.—E.L. Scheme.—An E.L. scheme is about to be carried out at Sherborne.

Surbiton.—E.L. Transfer.—The District Council has agreed to transfer its electricity undertaking to Messrs. Callender's Cable Co. for 42 years, subject to the approval of the B. of T. and L.G.B. to the terms proposed, under which the Council will be recouped for all its expenditure on the concern up to the transfer, and Messrs. Callender's will afterwards be responsible for capital requirements.

Thelwall.—Prov. Order.—The P.C. has decided to support the application of the Warrington T.C. for a prov. order for E.L., to include Thelwall in its area, on condition that the T.C. will guarantee to supply current when requested to do so.

Torrington.—Public Lighting.—The T.C. has decided that electricity be adopted, provided that the E.S. Co. can show that public lighting by electricity will be cheaper than by gas.

Trowbridge. — Hospital Lighting. — It has been decided to have the E.L. installed in the wards at the Cottage Hospital.

Wallasey. — Loan Sanction.—The L.G.B. has sanctioned the borrowing by the T.C. of £64,500, for a new electrical generating station at Poulton.

Walsall.—Sewage Pumping.—The Electricity Committee is taking steps to extend the D.C. main from Lichfield Street to the R.D.C.'s sewage pumping station at Rushall.

Whitstable.—Street Lighting.—In view of the approaching supply of electricity, the U.D.C. has given the Gas Co. notice to terminate the agreement for street lighting. There are 214 lamps, half of which are to be replaced by electric lamps.

TRAMWAY and RAILWAY NOTES.

Aberdeen.—Tramway Surplus.—It has transpired that the Secretary for Scotland insists on inserting a proviso, relating to the tramway surplus, in the prov. order promoted by the T.C., to the effect that the T.C. be restricted to placing £1,000 to the Common Good in any one year. A Committee of the Council has decided that it cannot recognise the right of the Secretary for Scotland to interfere with the decisions of the Parliamentary Committee which dealt with the order.

Dundee.—Year's Working.—The annual report of the Corporation tramway department states that the passengers carried during the past year numbered 19,042,344, compared with 17,734,162 in the previous year, and the gross receipts amounted to £69,505, as against £65,044. The gross profit, after crediting the accident insurance fund with £1,000, was £26,066.

Halifax.—Proposed Extensions.—The Tramway Committee has received deputations in respect of suggested tramway extensions, as follows:—From the Southowram D.C., which urged that the Southowram route should be extended to the Pack Horse Inn; from the Hipperholme D.C., which asked for developments in its district; from the Mytholmroyd D.C., which asked for an extension of two miles to Cragg Vale; and from the Halifax Advertising Club, which urged the advisability of continuing the tramways to Elland and Stainland.

India.—According to *Indian Engineering*, Messrs. Gladstone, Wylie & Co. have been licensed to supply electric traction for the Benares scheme, to be completed within three years.

Kirkcaldy.—Year's Working.—The revenue of the Corporation tramway department for the past year shows an increase of £1,743 over the previous year.

Lancashire. — An interesting light electric railway scheme is in course of development in South-East Lancashire, along the Yorkshire border. As a result of the great popularity of the electric tramway rides up into the hills, especially the branches from the Rochdale, Stalybridge and Hyde tramways, and the recent Oldham tramway extension to Grains Bar, it is now pro-

posed to link up the various hill termini by a light railway, following approximately the ridge of the Pennine chain of mountains.

The line will extend from near the Godley terminus of the Oldham, Ashton and Hyde tramways, and along Werneth Low and Mottram to Deep Cutting near the lofty Mottram terminus of the Stalybridge tramways, and thence by the Brushes Waterworks and Mossley, where a trestle bridge will carry the line over the River Tame, and *viâ* Grotton to Grains Bar, near the new upland extension of the Oldham tramways. From this point the line will be continued *viâ* Crompton Moor and the Wicken Hall Moor to Blackstone Edge, and thence to near Littleborough, not very far from the Rochdale tramway terminus, and *viâ* Summit to Bacup, to which town the Rochdale tramways were recently extended. From Bacup the line will continue to Haslingden and Accrington, but the line between Hyde and Bacup, with the intermediate places, will be dealt with first.

The net length of the latter—following the curved route—is 34 miles, but with necessary deviations, largely on account of gradient, the total length is about 52 miles. The line is not primarily intended for quick travelling, but will be a bracing scenic railway—much like the Manx railways—passing through scenery of surpassing interest and beauty.

To minimise the capital cost it is hoped to obtain supplies of current from the six existing tramway authorities whose hill terminals will be touched. As the maximum demand will always be at a time when the generating station loads are at present light, and as the projected line will act as a feeder for their tramways, it is expected that favourable terms will be arranged.

Mr. Lawton, of New Moston, Failsworth, is interested in this very promising project, which will be welcomed by hundreds of thousands of natives who love these hills but find numerous pretty parts difficult of access at present.

London.—L.C.C.—The Highways Committee reports that it is now considering an exhaustive report on the whole question of the tramway system, particularly from the point of view of linking-up and general consolidation. As the Committee has not had an opportunity of fully weighing the views of M. A. Mariage, who was consulted on the subject, it recommends that its report, which will contain proposals for obtaining Parliamentary powers to carry out schemes for linking-up the dead-ends on the system, be submitted after the summer recess. According to the *Daily Express*, the proposals will cost £1,250,000.

The B. of T. has consented to the running of trailer cars on the new line from Rushey Green to Beckenham Lane.

Middlesex.—The Middlesex C.C. (Western Road and Improvements and Finance) Bill, which contains a clause authorising the Council to charge ½d. per mile in respect of each motor-omnibus using the new road, was read a third time and passed by the House of Lords on Monday.

Rawtenstall.—The T.C. has been informed by the Burnley T.C. that it intends applying to Parliament next session for powers to lay a tramway from its terminus in Manchester Road to the terminus of the Rawtenstall tramways at Loveclough. The matter has been referred to the Parliamentary Committee.

Rochdale.—ACCIDENT CLAIMS.—Eighteen claims have been made against the T.C. in respect of the tramway accident at the bottom of John Street on February 14th. The whole of the claims have been settled for £1,357, which, with the costs incurred, brings up the total cost to the T.C. to £1,462, of which £1,000 has been received from the Insurance Co.

GOODS TRAFFIC.—The Tramways Committee has decided not to co-operate with Bury in the experiment of carrying goods by tramcar during the night.

Worsley.—The D.C. has decided to ask Sir George Pollard, M.P. for the Division, to use his influence again with the B. of T. to procure an independent inquiry into the condition of the cars of the South Lancs. Tramways Co. running through the district, and to ask for a report upon the overcrowding of the cars.

TELEGRAPH and TELEPHONE NOTES.

Cable Rates.—The rate for telegrams to Iquitos and certain other places in Peru is now 4s. 9d. per word by all routes.

Canada.—An automatic exchange for 10,000 subscribers is being installed at Medicine Hat (Alberta).

China.—In consequence of erroneous statements having been published regarding the contract between the Marconi Co. and the Chinese Government, of which some particulars were given in our issue of June 26th, the company informs us that it has every confidence that in due course the agreement will be signed and all mutual obligations will be fulfilled.

Portsmouth.—A deficiency of £1,390 in the accounts of the Corporation telephone department has been disclosed, for which the late Mr. Triggs, chief cashier, is alleged to have been responsible. The method adopted was to misappropriate cheques received near the end of the financial year, and show the rentals as outstanding. A duplicate receipt-book was also in use.

The Imperial Chain.—Replying to a question by Major Archer-Shee regarding a statement of the directors of Marconi's Wireless Telegraph Co. that nearly a year had passed since the ratification of the contract, and that the slow progress that the company had been permitted to make seriously prejudiced their interests, Mr. Hobhouse said it was a fact that delays had occurred in proceeding with the construction of the Imperial wireless stations through difficulties which could not be foreseen, but some further delay had been caused by proposals submitted by the company for an improvement in the working arrangements. The chief difficulties had, however, been removed, and were on the point of solution.

In the House of Commons on Monday, in reply to questions, Mr. Hobhouse said that the Government could not claim compensation from the Marconi Co. in respect of the non-renewal of the "7,777" patent. He had no reason to suppose that the company had delayed its work on the Imperial stations in consequence of the erection of its private station at Carnarvon.

It was stated that the delay in acquiring a site in India for the Imperial station was due to the decision to establish direct communication between India and Egypt instead of East Africa, which rendered the site selected at Bangalore unsuitable. Another site had been provisionally selected, and was at present under examination by experts.

The Telegraph Service.—The Committee to consider the organisation of the telegraph service, and to report what steps can be taken to improve the efficiency and economy of its working, consists of the following members:—Sir Archibald Williamson, M.P. (chairman), Sir Henry Norman, M.P., Sir Charles Stewart-Wilson, Sir William Plender, and Mr. A. M. Ogilvie, Third Secretary to the Post Office. Mr. W. E. Weston and Mr. W. R. Birchall, of the Secretary's Office, General Post Office, will act as secretaries to the Committee.

The Telephone Service.—The Postmaster-General recently stated that the disagreeable clicks heard in telephone receivers, concerning which complaints had been made, were due to the stronger currents employed in the more modern exchanges. Inquiries had been addressed to Chambers of Commerce as to the desirability or otherwise of discontinuing the practice of interrupting local conversations when trunk calls are made.

Wireless on Board Ship.—On Tuesday the Merchant Shipping (Convention) Bill was further considered by a Committee of the House of Commons. Mr. John Burns placed before the Committee the draft agreement between the Board of Trade and the Marconi Co., by which the charges made by the latter to shipowners for installations will be regulated; in case of disagreement between the parties, the matter will be decided by a referee. No shipowner will be obliged to use Marconi apparatus.

CONTRACTS OPEN and CLOSED.

OPEN.

Aldershot.—August 4th. U.D.C. One natural-draught chimney-type cooling tower. See "Official Notices" July 10th.

Ashton-under-Lyne.—Corporation. July 29th. Arc lamp globes, lamp carbons, D.C. motors and D.C. motor starters. See "Official Notices" July 10th.

Australia.—SYDNEY.—August 31st. Sydney Harbour Trust. Four electrically-operated semi-portable travelling cranes. Forms of tender from Mr. H. F. Norrie, Secretary to the Trust, Sydney.

September 14th. Municipal Council. 22,500 yd. of 33,000-volt, three-core, paper-insulated, lead-covered cable. Deposit £200. Specification, 10s. 6d., from the City Electrical Engineer; a copy may be seen at the B. of T. Commercial Intelligence Dept, London.

PERTH.—September 2nd. Telephone instruments and parts, glassware, battery material, chemicals for batteries, wire—cotton, silk or wool covered—telegraph and telephone insulators, for Postmaster-General. See "Official Notices" to-day.

MELBOURNE.—Eight 50-ton, one 30-ton, three 10-ton electric overhead travelling cranes, Contract No. 25,756, for the Victorian State Railways. Specifications from Messrs. John Coates & Co., Ltd., 115, Victoria Street, S.W.

RICHMOND.—Nov. 30th. Refuse destructor and auxiliary plant. Specification, &c., from Mr. C. C. Blazey, Town Clerk, Richmond, Victoria.

BRISBANE.—September 2nd. Measuring instruments, protectors and parts, telephone and telegraph instruments, for the Postmaster-General. See "Official Notices" to-day.

ADELAIDE.—September 2nd. Telephone material, bells, &c., condensers, diaphragms, generators, for the Postmaster-General. See "Official Notices" to-day.

Austria.—September 1st. The Austrian State Railway authorities in Vienna are inviting tenders for the supply and installation of a 60-ton electrically-operated travelling crane.

INNSBRUCK.—August 6th. Circular saw, with electric motor; smith's hammer, with electric motor; air compressor, with 40-H.P. electric motor; electric hand-boring machine, and other machinery. Particulars from Abteilung IV der k.k. Staatsbahndirektion, Innsbruck.

Birkenhead.—August 10th. Corporation. Cooling tower. See "Official Notices" to-day.

Blackburn.—August 1st. Twelve months' supply of steam coal for the Electricity Department. Mr. P. P. Wheelwright, Engineer and Manager.

Canada.—July 27th. 23 knots single-conductor submarine telegraph cable (107 lb. copper and 150 lb. gutta-percha per knot), delivered at Halifax, N.S., and 14 knots ditto, delivered at Vancouver, B.C. Also 270,000 lb. galvanised iron telegraph wire, delivered at Montreal, and 342,000 lb., delivered at Vancouver. Specifications from General Superintendent of the Government Telegraph Service, Department of Public Works, Ottawa. A copy of the specification may be seen at the B. of T. Commercial Intelligence Dept. in London.

China.—TIENTSIN.—August 4th. Boilers, turbines, electrical power plant and coining machines, for the Government Mint. Specifications, &c. (two at 5s. each), from Sir Douglas Fox and Partners, 56, Moorgate Street, E.C.

Croydon.—July 28th. Installation of electric fire-alarms, for the B. of G. Mr. Henry Berney, architect, 33 35, High Street (returnable deposit of £2 2s.).

Dover.—July 31st. Small coal (other than Welsh), for eight months, for the Corporation electricity works. Borough Electrical Engineer.

Eastbourne.—August 18th. Corporation. Main machine and feeder switchboard for the electricity works. See "Official Notices" to-day.

Epsom.—July 28th. 500 tons of Nixon's navigation large washed nuts, for the U.D.C. Electricity Dept. Particulars from Mr. A. C. Gilling, engineer, Church Street.

Kingston-upon-Hull.—August 22nd. Corporation. Electrical fittings for the Guildhall Council Chamber, &c. See "Official Notices" to-day.

London.—L.C.C. The Highways Committee recommends that tenders be invited from selected firms for the supply of fittings required in connection with the maintenance of overhead line equipment.

Oldham.—August 16th. Corporation. D.C. motor-generator and extension to E.H.T. switchboard. See "Official Notices" to-day.

Rochdale.—The Corporation General Purposes Committee has decided to recommend the renewal of electric wiring in some of the Town Hall Departments, at an estimated cost of about £150.

August 5th. Paper-insulated cables for 12 months. Particulars (£2 2s. returnable) from Mr. C. C. Atchison, Engineer and Manager, Dane Street.

Salford.—Flame arc lamps and lowering gear, for the electricity works. See "Official Notices" July 17th.

July 28th. Suspended iron gangways, Central Car Depôt. General Manager, 32, Blackfriars Street, Salford.

Southampton.—August 6th. Installation of lighting plant, cables, &c., at the Farm Institute, Sparsholt. See "Official Notices" July 17th.

The T.C. has decided to invite tenders for automatic coal conveyers at the electricity works (estimated cost £1,330).

Spain.—August 20th. Tenders are being invited by the municipal authorities of Herrera de Pisuerga (province of Palencia) for the concession for the electric lighting of the town during a period of 10 years.

September 9th. The Spanish Ministry of Public Works, in Madrid, are inviting tenders for the concession for the construction and working of an electric tramway between Ferrol and Santa Maria de Neda.

Tenders have just been invited by the municipal authorities of Cabra (province of Cordoba) for the concession for the public electric lighting of the town during a period of five years. The municipal authorities of Moncofar (province of Castellon) have also lately called for tenders for the concession for the electric lighting of that town.

Stalybridge.—E.H.T., three-core, lead-covered, paper-insulated cable, for the Stalybridge, &c., Tramways and Electricity Board. See "Official Notices" to-day.

Walsall.—August 11th. Corporation. Coal conveyer and measuring apparatus, jib coaling crane, ash-handling plant, travelling crane. See "Official Notices" July 17th.

Wisbech.—July 29th. Wiring of the workhouse for electric light installation, for the Board of Guardians. Particulars from Mr. R. W. Fairclough, Clerk.

CLOSED.

Aberdare.—The U.D.C. has accepted the tender of Messrs. Heenan & Froude for a refuse destructor, at £3,416.

Bennis Contracts.—Messrs. E. Bennis & Co., Ltd., have recently received contracts for their stokers from three municipal electricity supply authorities as follows:—

Wimbledon Corporation.—Two chain-grates, each 9 ft. 8 in. long × 6 ft. wide (repeat orde).
Burton-on-Trent Corporation.—Two machine stokers and self-cleaning compressed-air furnaces for an 8 ft. 6 in. diameter Lancashire boiler (repeat order).
Altrincham Corporation.—Two chain-grate stokers, each 5 ft. wide × 12 ft 6 in. long (per Stirling Boiler Co.).

Bolton.—The T.C. has accepted the tender of Messrs. Witter & Sons, Ltd., for the installation of automatic sprinklers and fire alarms.

Burton-on-Trent.—The T.C. has accepted the tender of Messrs. Manlove, Alliott & Co. for refuse destructor plant, at £2,340.

Buxton.—The U.D.C. has accepted the tender of Messrs. Day & Ferguson for Presley & Denby nutty slack combined, for the electricity works.

Canterbury.—The T.C. has accepted the tender of Mr. E. J. Philpott for electrical illuminations during the Cricket Week, at £27.

Fleetwood.—The Wentworth Silkstone Collieries, Ltd., and Messrs. Adam Bromley & Sons have each secured a contract for the supply of 1,000 tons of coal to the electricity works.

Government Contracts.—The following tenders have been accepted during the past month by the Government Departments named:—

ADMIRALTY, CONTRACT DEPARTMENT.

Tungsten filament lamps.—Cryselco, Ltd., Dick, Kerr & Co., Ltd., Pope's Electric Lamp Co.

WAR OFFICE.

Distributing boards.—General Electric Co., Ltd., Spagnoletti, Ltd.
Parts of electric cells.—Siemens Bros. & Co., Ltd.
Installation of electric light, Cavalry Barracks, Redford.—Lowdon Bros. and Co.

INDIA OFFICE, STORES DEPARTMENT.

Insulator cups.—Bullers, Ltd.

CROWN AGENTS FOR THE COLONIES.

Battery material and cable.—Siemens Bros. & Co., Ltd.
Telegraph materials.—Bullers, Ltd.. Siemens Bros. & Co., Ltd.
Telegraph poles.—Siemens Bros. & Co., Ltd., J. Spencer, Ltd.
Telephone equipment.—Automatic Telephone Mfg. Co., Ltd., I.-R., G.-P. and Telegraph Works Co., Ltd., Siemens Bros. & Co., Ltd.
Telephone materials.—British L.M. Ericsson Mfg. Co, Ltd.
Terminal boxes.—Siemens Bros. & Co., Ltd.

H.M. OFFICE OF WORKS.

Erection of Liscard new telephone exchange.—J. Henshaw & Sons.

POST OFFICE.

Protective apparatus.—British L.M. Ericsson Mfg. Co., Ltd., Western Electric Co., Ltd.
Telephonic apparatus.—Automatic Telephone Mfg. Co., Ltd., British L.M. Ericsson Mfg. Co., Ltd., General Electric Co., Ltd., Peel-Conner Telephone Works, Ltd., Phœnix Telephone & Electric Works, Ltd., Siemens Bros. & Co., Ltd., Western Electric Co., Ltd.
Telephonic cable.—Henley's Telegraph Works Co., Ltd., Johnson and Phillips, Ltd., Western Electric Co., Ltd.
Laying lines of multiple-way ducts, Hampstead, N.W., Swiss Cottage—St. John's Wood.—Grounds & Newton.
Ditto, Liverpool—St. Helens (section 2).—H. E. Buckley.
Ditto, Manchester—Oldham (section 2).—H. E. Buckley.
Laying lines of pipes and "U" shaped earthenware troughing, Fenham (Newcastle-on-Tyne).—G. H. Mauchlen.
Laying lines of self-aligning ducts and Mannesmann tubes, North Walsham—Bacton.—R. J. May.
Laying lines of single tube ducts, Newington Causeway—Walworth Road, S.E.—Grounds & Newton.
Lifts, Birmingham H.P.O., new parcels office.—R. Waygood & Co., Ltd.
Electric lifts to replace hydraulic lifts, Birmingham H.P.O.—W. Wadsworth & Sons, Ltd.
Manufacturing, supplying, drawing-in and jointing lead-covered cable, Leeds—Bradford.—Western Electric Co., Ltd.
Ditto, Leeds—Castleford.—W. T. Henley's Telegraph Works Co., Ltd.
Ditto, Huddersfield.—Western Electric Co., Ltd.
Ditto, Manchester—Oldham.—B.I. & Helsby Cables, Ltd.
Telephone exchange equipment alterations, Paddington.—Western Electric Co., Ltd.
Electric trolleys.—Edison Accumulators, Ltd.

Haslingden.—Mr. A. M. Cramp has received the following installation contracts:—

For Messrs. J. H. Birtwistle & Co., Ltd., Grane Road Mill, Haslingden, the electric lighting of their mill; also the electric lighting of their Park Mill, Helmshore.
For Messrs. C. Whittaker & Co. (1900), Ltd., engineers, of Accrington, electric driving of the whole of their Union Foundry, Haslingden.
For Councillor T. Baxter, Mayor of Haslingden, electric lighting, heating and bells at his residence, Helmshore House.
For Mr. Geo. W. Hardman, electric lighting, heating and bells for his residence, "Danesmoor," Haslingden.

Huddersfield.—The following tenders have been accepted:—

One "Pendulum" truck.—Peckham Truck and Engineering Co.
Rail grinder.—Equipment and Engineering Co.
Cable.—W. T. Glover & Co.

London.—L.C.C.—The Highways Committee reports having received the undermentioned tenders for either 3,000 driving-wheel and 2,000 pony-wheel tires for tramcars, or alternatively 6,000 driving-wheel and 4,000 pony-wheel tires :—

	Total for 3,000 driving-wheel tires and 2,000 pony-wheel tires.	Total for 6,000 driving-wheel tires and 4,000 pony-wheel tires.
A. Brown & Co. (agent for Société Anonyme des Aciéries d'Angleur, Belgium)	£4,408	£8,817
John Batt & Co. (London), Ltd. (accepted)	4,558	9,117
Phœnix A.G. (Germany)	4,729	9,458
Fried. Krupp A.G.	5,150	10,300
Bochumer Verein für Bergbau und Gussstahlfabrikation, Bochum (Germany) ..	5,200	—
H. Bessemer & Co, Ltd., Bolton	5,300	10,600
J. Baker & Co. (Rotherham), Ltd.	5,550	11,100
Workington Iron and Steel Co., Ltd. ..	5,667	11,333
Brown Bayley's Steel Works, Ltd.	5,800	11,600
J. Brown & Co., Ltd.	5,850	11,450
Steel, Peech & Tozer, Ltd.	6,575	—
Midvale Steel Co. of Philadelphia and London, Ltd.	7,900	15,800
Vickers, Ltd.	9,150	18,300

The lowest tender is that of Messrs. A. Brown & Co., the British agents for the Société Anonyme des Aciéries d'Angleur, who state, however, that they cannot agree to the clause respecting rates of wages, as their works are situated in Belgium, where no universal rates of wages or hours of labour obtain. They state that the works pay the highest wages for the best labour in the district concerned. The next lowest tender is that submitted by Messrs. John Batt & Co. (London), Ltd. The firm proposes to sublet the manufacture of the tires to the following firms :—Vereinigte Stahlwerke van der Zypen und Wissener Eisenhütten A.G., Cologne, Germany, and/or other approved German works, including Fried. Krupp A.G., Bochumer Verein, and Phœnix A.G.

The lowest tender for British-manufactured tires is that of Messrs. H. Bessemer & Co., Ltd., and amounts to £10,600, being an increase of £1,483, or 16 per cent., over the prices tendered by Messrs. John Batt & Co. (London), Ltd.

For the supply of four portable electrically-driven drilling and grinding machines the following tenders have been received :—

Geo. Robson & Co.	(accepted)	£288
Do.	(alternative)	280
Do.	Do.	320
Bambridge Flexible Shaft Co, Ltd. ..	.. ..	593
United States Metallic Packing Co., Ltd.	.. ..	540
Selson Engineering Co., Ltd.	.. ..	653
James Gibb & Co., Ltd.	.. ..	286

For the supply of 150 sets of plough collector gear, required in connection with the equipment of Class A and D cars with trolleys and collector gear :—

		Per set.
British Westinghouse E. & M. Co., Ltd.	(accepted)	£7 17 6
Brush Electrical Eng. Co., Ltd.	.. ..	7 19 0
Spagnoletti, Ltd.	.. ..	10 5 0
Estler Bros.	.. ..	11 0 0
Siemens Bros. Dynamo Works, Ltd. ..	.. ..	12 2 6

For the provision of a vertical drainage pump for draining water out of the tramway cable manholes :—

Drysdale & Co., Ltd.	(accepted)	£173
Rees Roturbo Manufg. Co., Ltd.	.. ..	212
British Electric Plant Co., Ltd.	Incomplete tender.	

BATTERSEA.—The B.C. Electricity Committee recommends that the contract with the Foster Engineering Co., Ltd., for metal-filament lamps for street lighting be extended for one year, and that it include also the supply of half-watt lamps for outside lighting under the hire scheme ; also that the tender of Messrs. R. Dempster & Sons, Ltd., be accepted for coal telpherage plant to specification, for £3,060.

HACKNEY.—The B.C. Electricity Committee reports having considered the tenders for open white arc lamp carbons. The three lowest were :—

General Electric Co., Ltd.—40,000 pairs at 70s. per 1,000, and 40,000 pairs at 60s. per 1,000, £260.
Henrion Carbons, Ltd.—40,000 pairs at 68s. 11d. per 1,000, and 40,000 pairs at 57s. 8d. per 1,000, £253.
H. Tuchman.—40,000 pairs at 68s. per 1,000, and 40,000 pairs at 57s. 6d. per 1,000, £251.

There being very little difference between the English and foreign prices, the Committee recommends that the tender of the General Electric Co., Ltd., for English-made carbons be accepted for :—

18 mm. by 12½ in. cored carbons, 13 mm. by 11½ in. solid „ } at 70s. per 1,000 pairs.
18 mm. by 10½ in. cored „, 13 mm. by 9½ in. solid „ } at 60s. per 1,000 pairs.
Subject to test on samples proving satisfactory.

For the supply of yellow flame arc lamp carbons the five lowest tenders were as follows :—

General Electric Co., Ltd.—100,000 pairs at 62s. 6d., £312.
Electrical Co., Ltd.—100,000 pairs at 61s. 6d., £307.
Sloan Electrical Co., Ltd.—100,000 pairs at 60s. 6d., £302.
Ship Carbons, Ltd.—100,000 pairs at 57s., £285.
W. Geipel & Co., Ltd.—100,000 pairs at 51s., £255.

The price of the English carbons being so much the higher, the Committee recommends that the tender of Messrs. W. Geipel and Co., Ltd., be accepted for :—

8 mm. by 12 in. cored carbons, 7 mm. by 12 in. „ „ } at 51s. per 1,000 pairs.
Subject to the test on samples proving satisfactory.

Tenders were also invited for special higher-grade carbons, but the prices being out of all proportion to the difference which their use would make to the lighting, the Committee does not submit any recommendation in regard to these.

SHOREDITCH.—The following tenders have been received by the B.C. for a battery in connection with the new converters :—

D.P. Battery Co. (recommended)	£181	Electrical Power Storage Co. ..	£200
Tudor Battery Co.	196	„ „ „ ..	*179

*Not in accordance with specification.

POPLAR.—The following tenders were received by the B.C. for a steam turbine-driven boiler feed pump :—

Worthington Pump Co.	..	£230
G. & J. Weir	(recommended)	285
Rees Roturbo Co., Ltd.	..	366
Willans & Robinson	..	380
Belliss & Morcom :		
(1) Belliss-Worthington	..	360
(2) Belliss-Mather & Platt	..	387
(3) Belliss-Rees Roturbo Co.	..	375

Messrs. G. & J. Weir also submitted an offer to install an air eliminator and heater, at £130, and their tender is recommended.

The following tenders have also been recommended for piping and valves :—

Babcock & Wilcox, Ltd.—Piping, £82.
J. Hopkinson & Co.—High-pressure feed non-return valves, £42.
J. Wilson, Ltd.—Low-pressure suction valves, £10.
Dewrance & Co.—Stop valves, £15.

Margate.—The T.C. has received the following tenders for fairyland electrical illumination plant at the Queen's bandstand :

Kingstone & Co.—£115 and £150, latter accepted.
Franco-British Electrical Co.—£142 and £162.
Imperial Lighting Co.—£125.

New Zealand.—The Wellington City Council has accepted the tender of Messrs. T. Ballinger & Co., at £357, for an electric lift at Reynold's Building, Victoria Street.—*N.Z. Shipping and Commerce.*

Ramsgate.—The contract for the electric light installation at Christ Church has been secured by the Ramsgate and District Electric Supply Co., Ltd.

Rawtenstall.—The T.C. has accepted the tender of Messrs. E. Green & Co. for an economiser (480 pipes).

Southampton.—The T.C. has accepted the following tenders for a refuse destructor at Portswood :—

T. Warrington.—Cells and boilers, £1,221.
Dyer & Sons.—Foundations, buildings, lighting, &c., £1,327.
Britannia Construction Co.—Chimney, £389.

Stoke-on-Trent.—Messrs. Chamberlain & Hookham, Ltd., have received the Corporation contract for meters.

Walthamstow.—The U.D.C. is recommended to accept the tender of the Whessoe Foundry Co., Ltd., at £65, for a c.i. tank for the blow-down sump at the electricity works.

FORTHCOMING EVENTS.

Association of Mining Electrical Engineers.—Saturday, July 25th. At 1 p.m. At Hebburn-on-Tyne. Visit to Messrs. Reyrolle & Co.'s, Bauxite Refining Co.'s, and Tharsis Copper Co.'s works.

THE ELECTRICAL ENGINEERS
(LONDON DIVISION.)

Commanding Officer—LIEUT.-COL. H. M. LEAF.

The following orders have been issued :—

Headquarters will be opened daily for the transaction of regimental business from 10 a.m. till 4 p.m., except Saturdays, on which days the opening will be from 10 a.m. till 12 noon. Headquarters will be closed for all purposes on August 3rd and 4th, 1914.

(Signed) F. R. HOLT-WHITE, Capt. R.E., Adjutant,
For Officer commanding L.E.E.

The London Electrical Engineers.—According to a Plymouth newspaper, an advance party of the London Electrical Engineers, some companies of which were to commence their training on Saturday, arrived at Staddon on 15th inst.

Municipal Ownership Commission.—According to the *Morning Post* a large commission is at present in this country from the United States, inquiring into municipal work in Great Britain, particularly so far as it concerns sanitation, water supplies, transport, lighting, and other matters under municipal control. Its members have been taking part in the Congress at Shepherd's Bush this week.

NOTES.

Electricity in the London Fire Brigade.—Electricity plays an important part in the latest addition to the motor equipment of the London Fire Brigade, an opportunity of inspecting which was afforded us at the headquarters of the brigade in Southwark Bridge Road, S.E., one day last week. The vehicle itself, which is known as an emergency tender, resembles an ordinary motor-van, except that there are at the front two rows of seats instead of one, there being accommodation for six persons in addition to the driver. The van body is divided into a number of compartments, in the largest one of which, at the rear, is mounted a dynamo arranged to be driven, by suitable gearing, off the four-cylinder petrol engine which propels the car. The generator, which has a capacity of 100 amperes at 100 volts, is employed to furnish the current for two portable searchlights, each of 3,000 C.P., and two clusters of three 100-C.P. electric lamps. The lighting sets are intended for use in searching among the ruins of burned-out buildings, and for this purpose the searchlights, which are mounted on tripods, and the lamp clusters, are provided with reels of cable 100 yd. long, so that the lights may be used at that distance away from the vehicle, which acts as the central station. The reels are carried in cupboards mounted on the running boards of the car. Another feature of the vehicle is the provision of an electrically-operated fan capable of discharging 400 cb. ft. of air per minute, this being intended for use in driving out smoke from basements and sewers, and so facilitating the work of the firemen. At the rear of the firemen's seat is a large switchboard containing the switches for controlling the searchlights, cluster lights, &c. The vehicle is also equipped with lockers, in which are stored four sets of breathing apparatus, such as is used in colliery accident rescue work, and by means of which it is possible for men to live for an hour in an irrespirable atmosphere. The men who have been appointed to duty in connection with the new van—which is stated to be the first of its kind to be adopted for fire brigade purposes in the world—have been specially trained at a mining rescue station in Yorkshire. The chassis of the van was built by Messrs. Dennis Bros., Ltd., of Guildford, while the electrical part of the work was carried out by Messrs. Crompton & Co., Ltd., of Chelmsford.

"F"-Rays Exploded.—It is reported that Signor Ulivi, the inventor of the "F-ray" sensation, has secretly left Italy on the eve of official tests of his system, taking with him the daughter of Admiral Fornani, one of his chief patrons. We have on a previous occasion pointed out the absurdity of the claims which he put forward; a solution to the method by which he was able to explode bombs immersed in water is now forthcoming. A quantity of sodium was found in his deserted workshop, and it is stated that he bored a tiny hole in the outer jacket of the bomb, and packed it on the inside with cotton wool, in contact with sodium. In the course of 10 or 20 minutes after the bomb was submerged the water percolating through the cotton wool reached the sodium, which consequently ignited and exploded the charge. In corroboration of this theory, it is pointed out that he never used any bombs that he had not made himself, and he never succeeded in exploding a bomb unless it was immersed in water. In his long-distance experiments he would never assist in putting the bombs into the water before proceeding in a motor-car to the spot where his apparatus was fixed. His accusers say that he had not time to do it. He dared not take the risk of being far from his "generating station" at the time of the immersion of the bombs, lest they should go off prematurely and give away the whole trick. He always insisted on night performances, and on the flashlight signals being sent to him at the very moment the bombs were placed in the water, and again when the bomb-layers had regained their ship or the shore.

E.C.C. Horticulture.—Recently a Horticultural Society has been formed in connection with the Electrical Construction Works at Bushbury. The first exhibition in connection therewith took place in the mess room on Saturday, when there was an attendance of 200 employés and friends. Mr. P. E. Beachcroft (chairman of the company), in opening the show, congratulated the competitors on their excellent exhibits. There were in all 30 exhibitors, divided into two classes:—"A," persons cultivating their own gardens without expert assistance, and not growing for sale; and "B," an open class. The show was in every respect a success.

Inquiry.—A correspondent writes:—"Do you know any good ready reckoners suitable for calculating consumers' accounts? The ordinary ready reckoner books go up to values which are never used for making out consumers' accounts, and furthermore, they are unduly compressed as regards useful figures. I think that a ready reckoner would be very useful if made out on strong linenised varnished cards. These could be kept handy, and it would be much easier to use them than to turn over the leaves of a book."

Battery Vehicles in Boston, U.S.A.—Since the Edison Electric Illuminating Co., of Boston, began its vehicle campaign three years ago there has been an increase of 250 per cent. in the number of electrical commercial vehicles in Boston, while the number of electric passenger cars has increased over 110 per cent. The number of cars and garages in Boston on January 1st was 463; there being 208 commercial cars, 255 passenger cars and 185 garages, as compared with 50, 117 and 57 respectively on January 1st, 1911. The company itself operates the largest fleet of cars, although the express companies have nearly 50 trucks and the coal companies more than 20. The breweries also operate more than 20 trucks.—*Engineer.*

American Westinghouse Strike.—A big strike has lately been in progress at the various Westinghouse works at Pittsburg, U.S.A. Copies of local newspapers have been received, depicting street scenes and describing the dispute. The Pittsburg *Leader* says that the prime cause of the strike seems to be that the Westinghouse interests refused to reason with the workers. "The employers either would not, or could not, see that conditions are different from 25 years ago, and it is impossible to deal with men and women as was done then. The times have changed, are still changing, and men and women with them. It is the changing views of men and women that make the changed times. The wages of workers are as important as dividends."

In the New York *Electrical World* for June 20th, the principles of both sides are stated. The declaration of the Allegheny Congenial Industrial Union sets forth the principles of the men thus:—

"We affirm the irreconcilable difference of interests between the employer who buys labour power in the labour market for the purpose of making a profit, on the one hand, and the wage-earner who sells his ability to produce wealth to some employer in order to secure the necessities of life, on the other. We know from bitter experience that the buyer and seller in the labour market can never see things from a common viewpoint, as the employer always buys as cheaply as possible, and we, as wage-earners, wish to sell our labour power for the highest possible wages.

"We are, therefore, determined to band together in an industrial union which recognises no distinction as to craft, sex, religious creed, political affiliations, age or nationality, for the purpose of compelling our common employers to give us every concession we can force from them by industrial solidarity.

"To such an object we pledge our united effort and call upon all workers in every industry of the Pittsburg district to join with us immediately in the organisation of a great democratic union which will include every man, woman and child that works for wages."

The principles to which the Westinghouse companies stand committed are expressed as follows:—

"1. Westinghouse shops shall be open shops. We stand for the principle of an open shop in which Union and non-Union men may work without molestation or being forced to join any organisation.

"2. Westinghouse employés may or may not be members of any organisation. We do not require of our employés that they shall refrain from joining labour organisations any more than we attempt to restrain them from joining any other bodies, but we maintain for all our employés the right to refrain from joining any organisation without prejudice to their positions, or their security, or their comfort in our employ.

"3. The pay of skilful and productive Westinghouse employés shall not be regulated by the pay of the inefficient and less productive. We pay wages and maintain shop conditions which compare favourably with other manufacturers in our industries. By this means, and by the added inducement of steady employment, we endeavour to attract the best workmen. In order to compete with other firms, both at home and abroad, we must introduce all of the agencies by which the best efficiency is obtained. We reserve the right to determine the compensation of our employés on the basis of the service they perform for us as well as by the day rate, which measures only the time spent in our works.

"4. Every Westinghouse employé has the right of conference with the management. We receive any one employé, or any number of employés, from any department, or any properly-chosen committee whose selection shall be truly representative from any department, or of the whole body of our employés.

"5. Every Westinghouse shop shall be safe, sanitary and comfortable, and all suggestions of employés for improvement in shop conditions are welcomed by the management. We seek to maintain the best standard of sanitary and working conditions in our factories, as we believe that to provide as good surroundings as the character of our operations permits is the best guarantee we have of obtaining and holding the best class of employés.

"As opposed to the principles advocated by the Allegheny Congenial Industrial Union:

"We assert that the interests of the employé and the employer are identical, and that there can be no success for either party unless each recognises the necessities of the other.

"We deny that employers and employés can never see things from a common viewpoint, and assert that the success of any business undertaking is dependent upon each endeavouring to view their common interests from the same viewpoint.

"We assert that in seeking for concessions neither party should attempt to obtain them either by force or compulsion."

Information which has reached us since the above was put into type shows that the strike was expected to come to an end on Monday, July 13th, a meeting of 4,000 strikers having resolved to return to work in a body on that day. The president of the Westinghouse Electric Co. said that no union would be recognised, nor would the men expect it to be. The strike began on June 5th. It was organised by the Allegheny Congenial Industrial Union, which was formed in February among the employés of the various plants of the Westinghouse group for the purpose of enforcing improved working conditions and, in some instances, advances in pay.

Science and the State.—The Executive Committee of the British Science Guild has appointed a Special Committee to report upon various matters arising in connection with science and the State and the encouragement of discovery, referred to in the address delivered by Sir Ronald Ross at the annual meeting of the Guild on May 22nd last.—*Times.*

Institution and Lecture Notes.—JUNIOR INSTITUTION OF ENGINEERS.—A party of members of the Junior Institution of Engineers paid a visit last Saturday afternoon to the Tunnel Cement Works, Purfleet. In the power-house the 1,200-KW. turbo-alternator is of the A.E.G. impulse type, having a steam consumption of 13·8 lb. per KW.-hour on full load, with a cooling water supply of five gallons per lb. of steam. The motors have been assembled in special motor rooms, so that they are in a large measure protected from the dust inseparable from cement manufacture. It has by this means been found practicable to use open-type motors. A certain amount of dust is, of course, inevitable, and the motors have therefore been provided with special insulation and dust-proof bearings, with heavy cast inspection covers.

INSTITUTION OF MUNICIPAL AND COUNTY ENGINEERS.—At a meeting held at the Town Hall, Hackney, on Saturday last, a paper was read by Mr. L. L. Robinson, the borough electrical engineer, on the refuse destructor works and the electricity undertaking of the borough.

INSTITUTION OF ENGINEERS.—The prize of the Central Mining and Investment Corporation has been awarded to Mr. G. M. Robertson, for his paper, "Central Power Station Working, with special reference to De Beers Central Power Station."

SOUTH AFRICAN INSTITUTE OF ELECTRICAL ENGINEERS.—At the monthly meeting on June 18th, Mr. E. A. Wallers (President of the Transvaal Chamber of Mines) presented the gold medals of the Institute to Mr. S. E. T. Ewing for the paper, read in 1912, entitled "Some Practical Aspects of Electric Hoisting," and to Mr. W. Elsdon Dew for his paper, read last year, entitled "Water Power Plants." Mr. Wallers said that he was keenly interested in the "Safety First" movement, and they were to be congratulated, and the men under them, on the few accidents that were due to electrical machinery, notwithstanding the enormous amount of electrical machinery there was in use, and the miles of cables there were on the Rand.—*South African Mining Journal.*

MIDLAND INSTITUTION OF MINING, CIVIL AND MECHANICAL ENGINEERS.—At the annual meeting at Sheffield on Tuesday, Mr. E. K. Scott read a paper on "Switchgear for Mines."

Fatalities.—On July 15th an inquest was held into the death of Samuel John Dorsett (28), an electrician, of Wolverhampton, who was killed on the previous Monday, at the Beehive Works of Messrs. J. S. Jordan & Sons, enamellers, Bilston.

John Butler, labourer, said he was assisting Dorsett to change a belt from one pulley to another in order to start the motor. For this purpose Dorsett was standing on two rolls about 4 ft. high. Witness suddenly heard him cry out, and saw that his hand had been caught between the belt and the motor. Witness seized his arm to pull him away, but received an electric shock and fell to the ground. Another workman ran to Dorsett's assistance, and, after working the belt (which was then stationary) in an opposite direction, Dorsett also fell to the ground, death taking place shortly afterwards.

In reply to the Factory Inspector, witness said he knew nothing of motors.

Walter Parkins, electrical engineer, of Wolverhampton, spoke to being summoned to the Beehive Works on Monday and to finding the motor alive owing to the insulation having given way. There would be no means of detecting this except by testing. The motor was operated by two switches, and could be made secure by an efficient earthing system. There was a cable near the motor, but it was not connected. The voltage was 200.—In reply to questions, witness said he put his hand on the motor and received a shock, which, under normal circumstances, he said, was not sufficient to kill a man. If the safety cable had been connected the shock would have been negligible. The operation of transferring the belt would have been perfectly safe if the current had been switched off.

Mr. Sidney Jordan, one of the proprietors of the works, said no complaint had ever been made to him about the motor; and it was Dorsett's duty to see that the safety cable was properly attached.

The jury stated they were of opinion that death was due to injuries to the head sustained by a fall after receiving an electric shock. They thought, however, that no blame could be attached to anyone.

Appointment Vacant.—Assistant electrical engineer for the Gun Carriage Factory, Jubbulpore, India (280 rupees per month). Particulars are given in our advertisement pages.

Educational Notice.—UNIVERSITY OF LONDON, KING'S COLLEGE.—Particulars are given in our advertisement pages to-day of the engineering courses that have been arranged, also a series of advanced electrical and other courses by experts.

The Coal Strike.—The report of Mr. G. Stuart Robertson, Chief Registrar of Friendly Societies for 1912, shows a decrease of nearly three-quarters of a million sterling—11 per cent. of the funds at the beginning of the year or over 10s. per member—in Trade Union funds, due almost entirely to the coal strike, which cost the miners' union considerably over a million pounds, and reacted upon the many other trades which are more or less dependent on the coal industry.

Birmingham Electrical Golfing Society.—The summer meeting of this Society was held at Sandwell Park on Tuesday afternoon, July 21st. There was up for competition a Challenge Cup, presented by Dr. Railing. H. F. Foster was the winner, with a net score of 79.

OUR PERSONAL COLUMN.

The Editors invite electrical engineers, whether connected with the technical or the commercial side of the profession and industry, also electric tramway and railway officials, to keep readers of the ELECTRICAL REVIEW *posted as to their movements.*

Central Station Officials.—MR. A. C. TICEHURST, assistant engineer at the Bexhill-on-Sea Corporation electricity works, who is resigning, is commencing business as an electrical engineer at the Crossing Works, Dorset Road, Bexhill.

Tramway Officials.—The Highways Committee of the L.C.C. recommends that the following temporary assistants, engaged in professional and technical work in the Council's tramway department, be appointed on the permanent staff from April 1st, 1914:—First Class—Messrs. G. B. Dunn, R. Barron, J. S. Ashley, and F. W. Brock, at £270 per annum; Second Class—Messrs. J. J. Harding, F. H. Wigner, £237 10s. per annum; G. G. Ringrose, A. W. Leath, R. S. Good, F. E. Gregory, £212 10s. per annum; Third Class—Messrs. N. H. Thomas, £200 per annum; C. W. Fourniss, A. F. Bentall, G. Clark, £190 per annum; H. F. Stanford, W. J. Thomas, R. E. S. Macintyre, T. McCrossan, £180; A. Wyatt, £170; Fourth Class, Section (*a*)—L. S. Price, £150; R. A. Nichols, £140. The Committee also recommends that Mr. J. R. Wignall, temporarily employed in the tramways department, be appointed, as from July 1st, 1914, permanent way inspector in the tramway department, at £330 per annum, rising by annual increments of £10 to £350.

The Southport Council has approved of the recommended increase (from £200 to £250) in the salary of MR. KENDREW, the tramways manager, in recognition of the improved returns on the system during the year, the gross profit being £1,621 better than in the previous year.

General.—We regret to learn that MR. HERBERT BERRY (Messrs. Berry, Skinner & Co.) has been laid up with a serious illness resulting from an accident to the knee. We are pleased to know that he is now making progress, though it will be some time before he is able to resume business at his office. We understand that the poison having spread in the limb, three or four operations were necessary, and these naturally reduced Mr. Berry to a very weak state. Last week he appeared to be progressing well, but it was found that a still further operation must be performed. After that operation, Mr. Berry's condition was very critical, but his physicians anticipate that after its immediate effects have passed away, a decided turn for the better may be looked forward to.

The *British Australasian* states that MR. J. G. BALSILLIE, the Australian Commonwealth wireless engineer, will sever his connection with the service in September next. Mr. Balsillie proposes to devote his attention to scientific experiments, and particularly to his scheme for producing rain. MR. E. B. JONES, acting secretary to the Victorian Railways, and MR. J. B. MOLOMBY, have left London for Germany on a tour of inspection of the electric railways of that country. MR. E. E. HIRST, managing director of the British General Electric Co., Ltd. (Australasia), will leave Marseilles on July 31st for Australia.

The daily Press states that MR. ARTHUR HURST, who since 1899 has been signalling engineer of the North-Eastern Railway, has retired, and is succeeded by MR. E. F. FLEET, of Newcastle-on-Tyne.

On July 17th, at James Street Congregational Church, Blackburn, MR. TOM SPEAK, electrical engineer, of Penny Street, was married to Miss Hannah Clegg.

MR. B. RAIKES, Electrical Inspector to the Government of Burma, is leaving shortly for Home, on nine months' leave. During his absence, MR. HARRY W. NIMMO, of Rangoon Electric Tramway and Supply Co., Ltd., will officiate.

MR. E. S. SMITH, who has been employed by the United Electric Car Co., Preston, for 15 years, and who held the post of superintendent of the finishing department, is leaving for Brazil to take up the position of assistant engineer to Messrs. J. G. White & Co., Pernambuco. The officials and employés at the car works at Preston have presented him with a gold watch and a dressing-case.

The marriage took place at Burford (Oxon.), on July 14th, of MR. GUY H. RIDGE, who is engaged on the electrical staff of the Western Union Telegraph Co., at Bay Roberts, Newfoundland, and Miss E. Pether, of Burford.

The marriage has taken place at High Street Church, Huddersfield, of MR. NORMAN WILSON, electrical engineer, Swansea, and Miss A. N. Hobson, of Huddersfield.

COL. D. R. STREET, secretary of the Ottawa Electric Co., was re-elected president, at the annual meeting last week, in Montreal, of the Canadian Electrical Association. The secretary-treasurer elected is MR. ALLAN SULLIVAN, Toronto.

Obituary.—Many members of the Oldham Corporation, and of the Corporation departments, attended the funeral of the late MR. S. W. NEWINGTON, borough electrical engineer of Oldham, on July 16th. Tribute to the ability of the deceased was paid at a meeting of the Electricity Committee on the previous day.

MR. J. BROADHURST, an electrical engineer of Colwyn Bay, who was about to open a shop in the town, died on July 16th, after a short illness.

Will.—The late SIR J. WILSON SWAN, F.R.S., whose death occurred in May, left £58,344 net personalty. He left his electrical and laboratory equipment, &c., to be presented to any person or institution or corporation that his executors might select to receive them. His bequests included one of £100 to the Royal Society (says the *Times*) for "defraying the cost of scientific publication."

THE NEW CABLE SHIP "EDOUARD JÉRAMEC."

WE recently had the pleasure of inspecting in the Thames the new cable ship *Edouard Jéramec*, which has been built for the Compagnie Française des Câbles Télégraphiques (the principal French Trans-Atlantic Cable Co.), by the Société Anonyme des Forges et Chantiers de la Méditerranée at Havre. This is the first cable ship built in a French shipyard, and will be employed in the repair of the company's cables, including deep-sea cables, in the North Atlantic; she will be stationed at Halifax, replacing her predecessor the *Contre-Amiral Caubet*, which has been in service for 17 years.

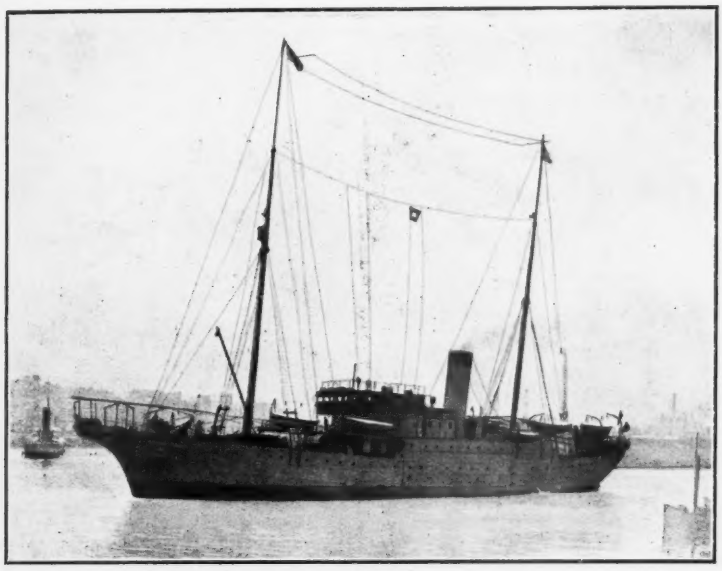

FIG. 1.—THE CABLE SHIP "EDOUARD JÉRAMEC."

The vessel is destined to operate in a cold climate, and therefore every effort has been made in her design to ensure the greatest possible comfort to the *personnel*, in order to compensate as far as possible for their long absence from home. For this reason the quarters of the officers and crew have been planned and fitted out on a lavish scale, and include a saloon, separate cabins, messrooms, a hospital and dispensary, lavatories, bath rooms, cold stores, kitchens, bakery, laundry, drying rooms, &c. Special provision has also been made for heating with steam, electric lighting, and the ventilation of the living quarters, as well as of the navigating bridge, which is completely enclosed.

The ship has been built under the supervision of the Bureau Véritas, and is provided with cellular water-ballast throughout her length, a double shell amidships, and a very complete system of transverse water-tight compartments. Her principal dimensions are as follows:—Length, 82 m. between perpendiculars; beam, 12·5 m.; depth to keel at spar-deck, 7·9 m.; draught when laden, 5·35 m.; displacement laden, 3,800 tons. The steel shell is strengthened beyond the requirements of the Bureau Véritas to provide for navigation amongst ice.

There are three cable tanks, 8·5 m. in diameter, and capable of carrying in all 800 tons of cable. The coal bunkers have a capacity of 850 tons, and generally provision is made for a cruise of 40 days at a distance of 1,500 km. from the base without calling anywhere in the interval.

The cable-handling gear was supplied by Messrs. Johnson & Phillips, Ltd., of London, under contract to the shipbuilders, and is illustrated below.

There are two cable machines, one forward for picking-up and dealing with comparatively short lengths of cable over the bows, the other aft for paying out long lengths of cable from the stern.

The forward equipment comprises two separate machines, with independent engines, so arranged that either or both of the engines may be used with either machine, so that for light work one engine only need be used, but for the heavy lifts both engines may be used driving one drum.

The cable drums on this machine are 1,740 mm. in diameter × 483 mm. wide between flanges, and each machine is arranged for two speeds, the picking-up machine for 25 tons at one knot, and 10 tons at 2½ knots, the paying-out machine for 10 tons at 2½ knots, and 6¼ tons at 4 knots. The engines are of the vertical two-cylinder high-pressure type, each capable of developing 110 B.H.P. with steam at a pressure of 160 lb. per sq. in.

The port side machine—for paying-out—embodies a new feature in the brake, comprising two rotary oil pumps geared directly to the cable drums and circulating oil through a system of pipes having a controlling valve. The resistance is regulated by the amount of opening of this control valve,

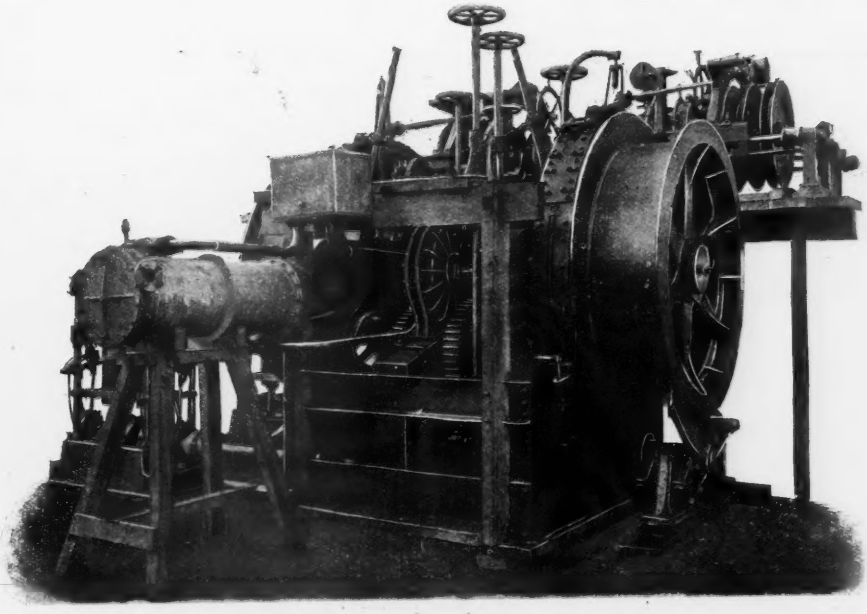

FIG. 2.—FORWARD CABLE-HANDLING GEAR

the power being taken up by heating the oil, which passes through a cooler provided with circulating water from one of the ship's water services. The pumps are very simple, and as all the parts are working in the oil, they are

perfectly lubricated, with the result that the oil may be subjected to pressures up to 70 kg. per sq. cm.

The gear stands on the main deck, the cable drums projecting through hatches in the spar deck. All the controlling gear is arranged on the spar deck, within the reach of one man, except the control for the fleeting knives, which, when necessary, has to be actuated from the main deck.

Fig. 2 shows this machine as erected in Messrs. Johnson and Phillips's works, and one of the rotary oil-pump brakes may be seen between the frames and just below the top decking.

The aft machine is a single machine, adapted mainly for paying-out cables, but provided with a small vertical engine of 45 B.H.P. for the purpose of hauling back when necessary. This machine stands on the spar deck, with all the controlling gear arranged at the after end of the machine. It is fitted with the patent rotary oil-pump brakes, as mentioned in connection with the forward machine.

Fig. 3 shows the machine as erected in Messrs. Johnson and Phillips's works; the two rotary oil-pump brakes may be seen at the centre of the picture between the two frames, and the double-helical wheel which drives them is seen inside the main cable-drum.

At the bow of the vessel three sheaves are fitted for passing the cable and the grapnel ropes, &c. One sheave only is fitted at the stern, for paying the cable away aft.

Dynamometers are fitted both forward and aft to register the strain on the grappling ropes and cable when picking-up, and on the cable while paying-out. These dynamometers consist of sheaves carried on a slide which is free to travel up and down a vertical cylinder, the inside of which is provided with a plunger working in oil, forming a dash-pot, so as to steady the movement and prevent jumping.

For transferring the cable from one tank to another, an electric hauling gear has been provided. This consists of a "V" sheave with frames and suitable gearing and an electric motor of 6 B.H.P. supplied from the ship's lighting circuit. The gear is erected on a cast-iron bedplate provided with runners for portability about the deck.

For deep-sea sounding work an electric sounding machine is provided, having a motor of 3 B.H.P. and suitable for sounding in depths up to 5,000 fathoms.

The auxiliary machines include a donkey-boiler and steam telemotor; two steam windlasses; a Seagers refrigerator; a Buhring filter; submarine signalling apparatus; two Sautter-Harlé electric generating sets of 20 and 7 KW. at 110 volts; two electric fans rated at 500 m.³ per hour, to ventilate the workrooms, living quarters and officers' cabins; a projector, and a Morse signal lantern. The bridge is provided with an electric log, and Graham loud-speaking telephones with connections to all parts of the vessel. Most of the electrical testing apparatus will be taken over from the *Contre-Amiral Caubet*.

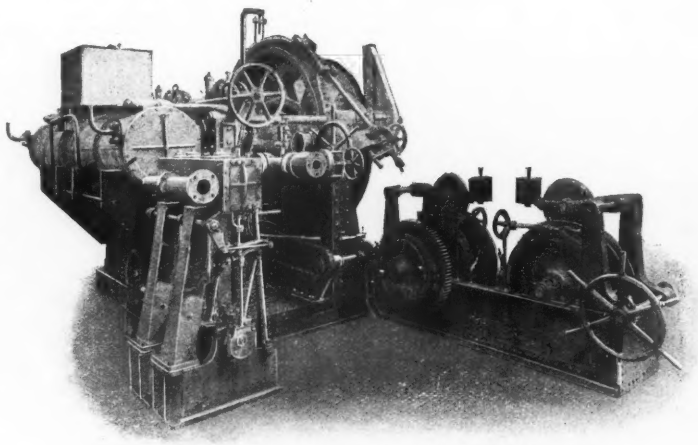

FIG. 3.—PAYING-OUT MACHINE OF C.S. "EDOUARD JÉRAMEC."

The boat equipment includes a launch 10 m. long, propelled with a heavy-oil engine of 40 H.P., launched with Welin davits, which are also provided for the boats used for work on the cables.

The twin-screw propelling machinery comprises two triple-expansion engines, with condensers and independent pumps, and two return-tube boilers with Howden forced draught. The speed guaranteed was 11·75 knots; that actually attained was 12·56 knots, with 2,100 H.P. During a test run of 24 hours at 11·36 knots, the coal consumption was 74·15 kg. per mile, against 89 kg. specified.

In view of the nature of the work for which this ship is designed, it wasvery important that the engines should be able to run without stopping at a very low speed, and that they should be capable of quick reversal; under test, a speed of 11 R.P.M. was maintained, corresponding to about 1 knot, and at normal speed reversal was effected in 5 seconds.

The wireless telegraph installation, provided by the Cie. Générale de Radiotélégraphie, is of a type recently installed on some French warships, but not on any other steamship, and is at present the most powerful in the French mercantile marine. Its range by day, at sea, is 900 to 1,000 km., and at night 3,500 to 4,000 km. The power employed is 5 KW. alternating, and the system uses musical emission with shock excitation, combining with ease of regulation great facility for tuning, as the wave is simple and very little damped. For normal running current is supplied at 500 cycles by a converter fed from the ship's direct-current circuit. The latter, however, can be dispensed with; the converting set is then driven directly by a petrol engine, the D.C. motor serving as exciter.

Including the staff, there are about 80 persons on board. The chief engineer is M. Loriot, and the captain M. Lemarteleur. Our thanks are due to the shipbuilders, and the makers of the cable machinery, for assistance in the preparation of this article, as well as to M. P. Neyreneuf, engineer to the Compagnie Française, for his courtesy in conducting our representative over the vessel.

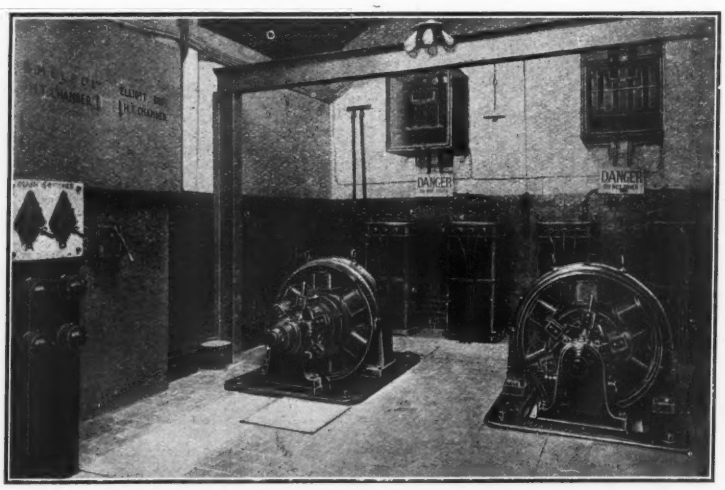

FIG. 1.—MESSRS. ELLIOTT BROTHERS' WORKS SUB-STATION. (See p. 141.)

POWER AND LIGHT AT MESSRS. ELLIOTT BROTHERS' WORKS.

Through the courtesy of Messrs. Elliott Brothers we were recently enabled to inspect some developments in connection with the power supply to and lighting of their well-known works at Lewisham. In connection with the former matter a modern rotary converter sub-station has now been built, in which are installed two Westinghouse 135-kw. rotary converters, with transformers, and both H.T. and L.T. switchgear. The supply is derived from the two-phase 3,000-volt circuits of the South Metropolitan Electric Light and Power Co., and our view (fig. 1, p. 140) shows the company's oil-switches mounted on the wall to the left, with a H.T. chamber containing instrument fuses and transformers, while close beside it is the works H.T. chamber containing the consumers' instrument transformers and fuses.

Below is the H.T. starting-switch for the rotaries, which is connected, through isolating links mounted on the end wall, to four Westinghouse oil-cooled transformers below, a pair of transformers—one in each phase—supplying each converter.

The rotaries are started up from the A.C. side by voltage tappings on the transformers and change-over switches; the L.T. board, shown in fig. 2, includes two A.C. starting panels and two D.C. generator panels, while the remaining panels carry switch-fuses for 18 feeders, and battery switchgear in connection with a 100-cell Chloride battery used in instrument testing and for overtime working. The direct-current supply for the works motors is at 200 volts. As would be expected, the board is liberally equipped with instruments, the rotary panels being provided with a total consumption recording wattmeter for measuring the alternating-current input in both phases, and a H.T. recording voltmeter; direct-current polarity indicators are also fitted, and a power-factor indicator. A direct-current integrating wattmeter enables the generated energy to be checked against that received from the alternating mains; a direct-current voltmeter and ammeter of the recording pattern are also provided.

Although the group drive is employed in the works to a considerable extent, it is worth noting that Messrs. Elliott Bros. have found it profitable, under the conditions obtaining in their business, to employ individual driving in connection with the numerous small lathes, drills, &c., required for instrument work, and about a hundred motors of from $\frac{1}{16}$ to $\frac{1}{4}$ H.P. are in use. The normal load-factor of the works is some 30 per cent.

The opportunity has also been taken to reorganise the lighting throughout the works, the general scheme—which was suggested by Mr. Haydn Harrison and carried out by Messrs. Elliott Bros.—consisting of low-voltage, low candle-power units for the individual lighting of benches, machine tools, &c., and of four and six-light clusters for general illumination.

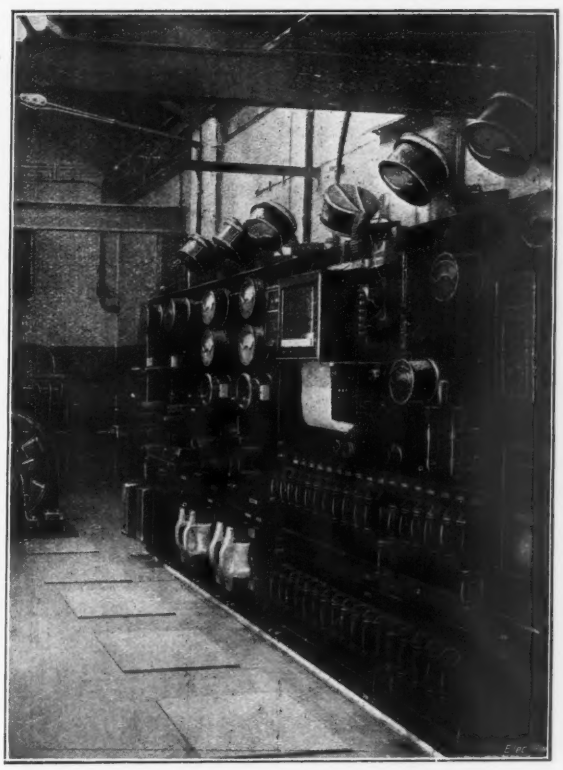

Fig. 2.—Low-Pressure Switchboard in Sub-Station.

Fig. 3.—Interior of One of the Workshops, showing Wiring.

The wiring, which is all exposed and run overhead, is arranged on a three-wire system with 100 volts across the outers and an earthed neutral; braided cable is used, attached to porcelain insulators, and the lighting units—10-watt tungsten lamps in Benjamin focusing steel shades—are suspended from detachable G.E.C. ceiling roses, enabling the whole pendant to be quickly removed to a new position, or replaced by a spare fitting if any failure occurs. The pendants are arranged in groups of from five to eight on one switch and fuse, a neat Vedovelli-Priestley wall-fitting being used for this purpose.

About 1,000 lamps have been installed, and these are supplied from the South Metropolitan Co.'s 400-volt single-phase system, through a 10-kw. Berry transformer,

secondary tappings being provided to give 50, 52½ and 55 volts to allow for pressure regulation.

Fig. 3 gives a good idea of the exposed wiring, pendant lights, &c., in one of the shops with a flat ceiling. In the machine shop, with an open roof, the wiring is carried on insulators in the roof principals, with branches to either side taken from small bus-bars and leading to suitable positions for pendant or machine lighting. In the case of the latter, where pendants are inadmissible, the wiring is carried from overhead, down vertical steel barrel, to a special machine-lighting fitting, which has been developed for the purpose by the firm.

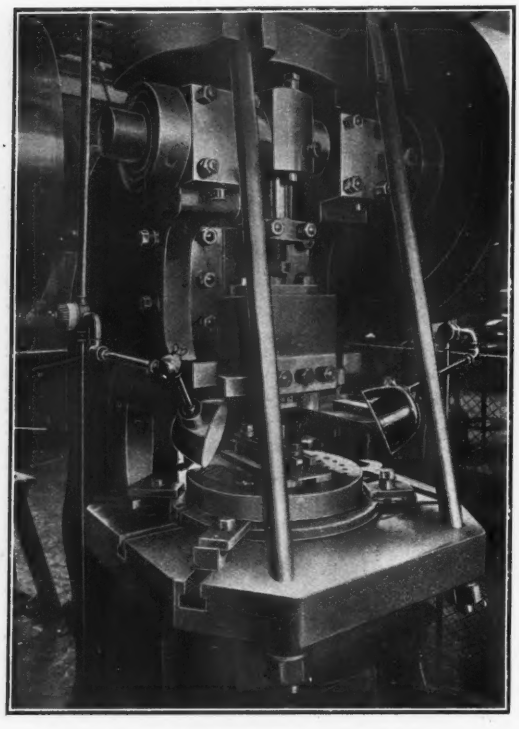

Fig. 4.—Arrangement for Lighting a Press.

Fig. 4 shows a press with one of these fittings on either side; as will be seen, they are built up of short lengths of barrel with movable joints to give flexibility. The lamp, in an anti-vibration holder, is carried in a parabolic reflector, the base of which is not attached rigidly to the tube, but arranged to turn round so that the light may be directed as desired. The bracket is attached to a junction-box, which also carries the tumbler switch controlling the light. The press is a difficult machine to illuminate on account of the inaccessibility of the work, while for accurate tool-setting good light is essential. The new fitting gives adjustment in every direction, and is much superior to the portable lamp, as the light can be directed on to the work and away from the eyes of the machinist. Generally the illumination provided on benches is 2½ to 3½ foot-candles; on machines a usual figure is 10 foot-candles, but in exceptional cases as much as 20 foot-candles is provided.

In the foundry six K-type Cooper-Hewitt mercury-vapour lamps are employed, run two in series on 200 volts. Each of these gives 1,000 c.p., making in all 6,000 c.p. for a floor area of 60 ft. by 40 ft.

In conclusion, our thanks are due to Messrs. Elliott Bros. and to their engineer, Mr. Phillips, for their assistance in the preparation of these notes.

EDISON 'BUSES FOR SOUTH SHIELDS.

Recently a preliminary trial was held of one of two battery 'buses which Messrs. Edison Accumulators, Ltd., are supplying to the South Shields Corporation. These 'buses are intended to act as feeders to the tramway system, over a route about 1¼ miles long, with two short gradients due to railway crossings which were unsuited to tramway working.

The trial run, in London, took place over 13 miles of busy streets in the West-End. A hill-climbing test was made at Aubrey Road, Holland Park, where the maximum grade is 1 in 8, and the average grade 1 in 10, this hill being smoothly negotiated from a dead stop at about 6 miles an hour.

The vehicle, which we illustrate below, has several features of constructional interest. The body is of the single-deck type, with a front entrance only, so that the driver can collect fares; seating is provided for 22 passengers and a driver, both longitudinal and cross seats being fitted. The battery consists of 60 Edison A-8 type cells, for 65 volts, 300 ampere-hours capacity; it weighs 1,800 lb., and is placed under the seats to facilitate inspection.

The motor, mounted under the driver's footboard, is a 4-pole series-wound totally-enclosed machine, fitted with dust-proof ball bearings, and easily replaced copper-faced carbon brushes; the motor drives through a propeller shaft to a differential bevel lay shaft mounted behind the accumulator housing, and thence to the rear hubs by roller chains. The controller is of the drum type, giving four forward and two reverse speeds; internal expansion brakes are fitted to the rear wheels, and all the wheels are fitted with Timken roller bearings and solid rubber band type tires.

The lighting, both internal and external, is supplied from an independent six-cell Edison battery, arranged to be charged in parallel with the traction battery at night. The complete vehicle weighs 8,000 lb., and it has a mileage of 40 to 50 per charge on good roads, which can be increased to from 80 to 100 miles per working day, by short boosts between trips.

We are indebted to Messrs. Edison Accumulators, Ltd., for the foregoing particulars.

An Electric Hotel Omnibus.—An electric eight-passenger station omnibus has recently been put in service by the Marine Hotel, North Berwick. The vehicle, which is stated to be the first of the kind in this country, is intended for the conveyance of passengers and their luggage to and from the railway station. The chassis is of the standard Edison 20-cwt. design, and is equipped with a battery consisting of 60 Edison A4-type cells, the approximate mileage per charge being normally about 40. The body of the 'bus, which was built by Messrs. James Young and Co., of Bromley, Kent, is designed to accommodate eight passengers, the driver and luggage.

Edison Electric 'Bus for South Shields.

NEW COMPANIES REGISTERED.

International General Artificial Coal and Fuel Co., Ltd. (133,881).—This company was registered on July 8th, with a capital of £100,000 in £20 shares, to carry on the business indicated by the title and that of manufacturers, and preparers of, and dealers in manure and manurial products, manufacturers of chemical and electro-chemical products, &c., and to adopt an agreement with J. Pfeiffer, G. Weiss, and W. Zeitler. The subscribers (with one share each) are:—R. H. Dulow, 117-18, Leadenhall Street, E.C., secretary; L. de Sarandy, 6, Broad Street Place, E.C., secretary; T. Wood, 44, Blenheim Grove, Peckham, S.E., accountant; S. A. Romain, 6, Broad Street Place, E.C., secretary; I. Hinton, 12, Brunswick Place, City Road, E.C., clerk; C. E. Best, 117, Leadenhall Street, E.C., director; H. Martelli, 117, Leadenhall Street, E.C., clerk. Minimum cash subscription, 50 shares. The number of directors is not to be less than three or more than five; the first are J. Pfeiffer, W. Zeitler, and G. Weiss. Remuneration, £50 each per annum (chairman £100). The profits of the company, when it shall from time to time be determined to distribute, are to be applicable:—5 per cent. for sinking fund, 10 per cent. for board of directors, 5 per cent. at the disposal of such board, and 80 per cent. to the shareholders. Registered office, 117, Leadenhall Street, E.C.

Horrabridge and District Electric Supply Co., Ltd. (136,863).—This company was registered on July 7th, with a capital of £2,000 in 10s. shares, to carry on the business indicated by the title. The subscribers (with 40 shares each) are:—W. G. Broad, Walkham Villa, Horrabridge, architect; A. H. Hanns, Post Office, Horrabridge, post master; G. Harrds, Roslyn, Horrabridge, purveyor; H. H. Netherton, Station Road, Horrabridge, baker; J. B. Sargent, Phœnix House, Horrabridge; C. Tregilius, The Highlands, Horrabridge, corn merchant; J. Tucker, Glenfinlas, Horrabridge, retired draper. Minimum cash subscription, £200; the first directors are W. G. Broad, A. H. Hanns, G. Harris, H. H. Netherton, J. B. Sargent, C. Tregilius and J. Tucker; qualification, 40 shares. Registered office, 12, Station Road, Horrabridge, Devon.

Electrical Sales Promotion, Ltd. (136,876).—This company was registered on July 8th, with a capital of £1,000 in £1 shares, to prepare and design advertising and other trade literature, to enter into arrangements with manufacturers of, and dealers in, electrical goods and appliances; to carry on the business of advertising contractors and agents, &c. The subscribers (with one "B" share each) are:—R. M. F. Robertson, 22, Tudor Street, E.C., director of Dobson, Molle & Co., Ltd.; W. T. Gibb, 22, Tudor Street, E.C., stationer. Private company. The directors are to number not less than two or more than five. So long as Dobson, Molle & Co., Ltd., hold 500 shares, they may appoint one half of the directors, one of whom shall be chairman. The first directors are R. M. F. Robertson (chairman), and J. C. Price. Registered office, Craven House, Kingsway, W.C.

Patentees Attorneys, Ltd. (136 845).—This company was registered on July 6th, with a capital of £1,000 in £1 shares, to carry on in the United Kingdom and elsewhere the business of agents for English, Colonial, and foreign patents, agents de brevets, attorneys for patentees, international patent experts and advisers, &c. The subscribers are:—G. Gilman, 1, Arlington Park Mansions, Chiswick, W., miller, 10 shares; E. J. Lacombe-Lane, 8, Arlington Park Mansions, Chiswick, W., patent expert, 80 shares; Mrs. G. Lacombe-Lane, 8, Arlington Park Mansions, Chiswick, W., 10 shares. Private company. The number of directors is not to be less than two or more than four; the first are G. Gilman and E. J. Lacombe-Lane. Solicitors, Brandon & Nicholson, 3 and 4, Suffolk Street, Pall Mall East, S.W.

Bachelet Levitated Railway Syndicate, Ltd. (136,897).—This company was registered on July 9th, with a capital of £50,000 in £1 shares, to carry on the business indicated by the title, and to adopt an agreement with Emile Bachelet. The signatories (with one share each) are:—W. Simpill, 7, Bennett Street, St. James's, S.W., gentleman; R. G. Wightman, Sherwood Park Road, Sutton, Surrey, gentleman. Private company. The first directors (to number not less than three or more than seven) are to be appointed by the signatories: qualification, £25. Registered office, Trafalgar House, 11, Waterloo Place, S.W.

S. Smith & Sons (Motor Accessories), Ltd. (136,013).—Registered July 15th, by Clifford, Turner & Hopton, 8, Finsbury Pavement, E.C. Capital, £100,000 in £1 shares. Objects: To take over the business of manufacturers of speedometers, carburettors, dynamos and other accessories of all kinds carried on by S. Smith & Sons, Ltd., at 179-185, Great Portland Street, W., and to adopt three agreements (1) referred to as the "sale agreement" with the said company, and (2 and 3) referred to as the "management agreements" (*a*) with A. G. Smith and (*b*) with R. A. Smith. The subscribers (with one share each) are:—H. W. Hill, 74, Grantham Road, Clapham, S.W., clerk; W. A. Sumsion, 52, Rona'd's Road, Highbury, N., clerk; E Newton, 8a, Maryville Terrace, Sydney Road, Muswell Hill, N., clerk; E. King, 11, Oxford Terrace, Albert Road, South Norwood, S E., clerk; G. Clements, 14, St. Margaret's Avenue, Harringay, N., clerk; W. G. Banning, 78, Holland Road, Brixton, S.W., clerk; H. R. Parkes, 12, Stafford Road, Walthamstow, N.E., clerk. Minimum cash subscription, seven shares. The first directors (to number not less than three or more than nine) are S. Smith, 59, Redington Road, Hampstead, chairman (governing director of S. Smith & Son, Ltd.); C. W. Nicholls, 35, Craven Gardens, Wimbledon (manager, Provincial Sales Department, S. Smith & Son, Ltd.); R. A. Smith, 58, Redington Road, Hampstead (manager, Carburettor Department, S. Smith & Son, Ltd.); G. W. Arnold, 9, Caversham Avenue, Palmer's Green (export manager, S. Smith and Son, Ltd.); and A. G. Smith, Hook Farm, Aldingbourne, Sussex, managing director (manager, Motor Accessories Branch, S. Smith & Son, Ltd.); qualification, £250; remuneration, £50 each per annum (chairman £100). Purchase consideration £50,000 payable by the allotment of 50,000 fully-paid shares. The vendor company will also receive in respect of the profits of the business, from March 31st down to completion, the estimated and agreed amount of £4,000. Secretary and registered office, F. A. Cotterell, 179, Great Portland Street, W.

British Chamber of Commerce in the Argentine Republic (Incorporated).—(The word "Limited" is omitted from the title by licence of the Board of Trade).—Registered July 14th, by Corbould, Rigby & Co., 1, Henrietta Street, Cavendish Square, W., as an association limited by guarantee, with not more than 1,000 members, each liable for £5 in the event of winding up. Objects: To carry on the business indicated by the title (politics expressly excluded). The Chamber is to consist of British incorporated companies, merchants, traders, representatives and/or agents trading in or with the Argentine Republic. The first members of the Council are the following (all of Buenos Ayres):—Hope Gibson, produce broker; H. H. Long, finance; T. Lloyd, banker; T. S. Boadle, steamship agent; J. W. Barclay, importer; D. G. Anderson, representative; C. H. Pearson, railway manager; A. G. Thornton, merchant; H. Tudor, merchant; J. K. Cassels, merchant; F. H. Chevallier-Boutell, Lloyds' agent; G. Lloyd Davies, company manager; J. Begg, merchant; R. A. Sumner, merchant; P. A. Grassick, accountant and auditor; J. Walker, merchant; R Paton, manager of insurance company; W. A. Agar, merchant; E. M. Simpson, contractor; W. E. O. Maxell, company manager; and H. C. Thompson, merchant. Registered office, 1, Henrietta Street, Cavendish Square, W.

Granville, Burgess & Co., Ltd. (137,054).—This company was registered on July 17th, with capital £500 in £1 shares, to carry on the business of electricians, mechanical engineers and manufacturers, workers of and dealers in electricity, motive power and light, &c. The subscribers (with one share each) are:—H. Hart, 14, Swale Street, E., solicitor's clerk; K. Roberts, 37, Walbrook, E.C., typist. Private company. The number of directors is not to be less than three or more than five; the subscribers are to appoint the first; qualification, one share. Solicitors, B. A. Woolf & Co., 37, Walbrook, E.C.

British Electrical Accessories, Ltd. (136,958).—This company was registered on July 13th, with a capital of £1,000 in £1 shares, to take over the business of an electrical supplies factor carried on by C. Pullan, at 80, King's Parade, Bradford. The subscribers (with one share each) are:—C. Pullan, 80, King's Arcade, Bradford, engineer; J. S. Rhodes, Station Road, Keighley, electrical engineer; W. D. Wilson, 41, Swan Arcade, Bradford, electrical engineer; W. H. Wilkinson, 182, Harris Street, Bradford, electrical engineer. Private company. The number of directors is not to be less than two or more than five; the first are C. Pullan, J. S. Rhodes, W. D. Wilson, G. V. Laycock and W. E. Shuttleworth; qualification, 50 shares. Registered office, 17 and 19, Fawcett Road, Bradford.

Market Securities Co., Ltd. (137,009).—This company was registered on July 15th, with a capital of £20,000 in £10 shares, to carry on the business of bankers, capitalists, financiers and concessionaires, dealers in stocks and shares, &c. The subscribers are:—E Garcke, 1, Kingsway, W.C., M.I.E.E., 50 shares; C. G. Tegetmeier, Normanhurst, Brighton Road, Purley, director, 50 shares; C. H. Dade, 1, Kingsway, W.C., manager, one share; W. J. Allen, 1, Kingsway, W.C., secretary to the Electrical and Industrial Investment Co., Ltd., one share; H. Kingsbury, 1, Kingsway, W.C., chartered secretary, one share; C. F. James, 1, Kingsway, W C., secretary, one share; J. P. Savage, 1, Kingsway, W.C., clerk, one share. Minimum cash subscription 5 per cent. of the shares offered to the public. The number of directors is not to be less than two or more than five; the first are E. Garcke and C. G. Tegetmeier; qualification, £250; remuneration as fixed by the company. Registered office, 1, Kingsway, W.C.

Economic Electric, Ltd. (136,987).—This company was registered on July 14th, with a capital of £10,000 in £1 shares, to take over the business of merchants, manufacturers and warehousemen of electric and other goods carried on by S. G. Frost and D. Poupart, at Twickenham, as the Economic Electric Co. The subscribers are:—S. G. Frost, 64, London Road, Twickenham, electrician, 100 shares; D. Poupart, 64, London Road, Twickenham, electrician, 100 shares; A. Holt, 3, Duke Street, Adelphi, W.C., gentleman, 200 shares. Private company. The number of directors is not to be less than three or more than five; the first are A. Holt, and others to be appointed by the shareholders; qualification, 100 shares. Registered office, 64, London Road, Twickenham.

OFFICIAL RETURNS OF ELECTRICAL COMPANIES.

Kingolite Co., Ltd.—Particulars of £800 deb., created June 24th, 1914, filed pursuant to Sec. 93 (3) of the Companies' (Consolidation) Act, 1908, the amount of the present issue being £400. Property charged: The company's undertaking and property, present and future, including uncalled capital. No trustees.

James Keith & Blackman Co., Ltd.—Issue on July 6th, 1914, of £100 deb., part of series of which particulars have already been filed.

Everett, Edgcumbe & Co., Ltd. (84,764).—Capital, £25,000 in £1 shares (5,000 6 per cent. cum. pref., 19,997 ord. and three "A"). Return dated July 1st, 1914. 3,800 pref., 18,643 ord. and three "A" shares taken up. £1 per share called up on 2,500 pref., 8,595 ord. and one "A." £11,096 paid. £10,850 considered as paid on 800 pref., 10,048 ord. and two "A." Mortgages and charges: £1,600.

Electrical Co., Ltd. (36,819).—Capital, £100,000 in £5 shares. Return dated April 20th, 1914. All shares taken up. £2 12s. 6d. per share called up on 17,000, and £2 per share on 3,000. £50,625 paid. £9,000 (£3 per share) considered as paid on 3,000. Mortgages and charges: Nil.

General Electric Tramway Co., Ltd. (43,428).—Capital, £50,000 in £1 shares; return dated March 23rd, 1914; 18,500 shares taken up; £18,500 paid. Mortgages and charges: £11,000.

Eastern and South African Telegraph Co., Ltd. (13,306).—Capital, £600,000 in £10 shares; return dated May 27th, 1914; all shares taken up and paid for in full. Mortgages and charges: Nil.

I.T.C., Ltd. (99,612).—Capital, £10,000 in £1 shares. Return dated February 10th, 1914. All shares taken up. £10,000 paid. Mortgages and charges: £1,000.

Electromotors, Ltd. (60,826).—Capital, £50,000 in £1 shares. Return dated May 28th, 1914. 42,370 shares taken up. £42,370 paid. Mortgages and charges: Nil.

Shipston Electrical Co., Ltd.—Particulars of £300 second debentures created July 9th, 1914, filed pursuant to Sec. 93 (3) of the Companies' (Consolidation) Act, 1908, the whole amount being now issued. Property charged: The company's undertaking and property, present and future, including uncalled and unpaid capital. No trustees.

Bagdad Tramways and Electric Lighting Syndicate, Ltd. (124,213).—A memorandum of satisfaction to the extent of £8 400 (being amount issued) on May 7th, of trust deed dated April 2nd, 1914, securing £15,800, has been filed. (The charge has now been cancelled.)

Particulars of Work and Wages.—We have received from the Home Secretary the draft of an Order which he proposes to make under Sec. 116 of the Factory and Workship Act, 1901. The effect is to require particulars of work and rate of wage to be given to all persons paid by the piece who are employed in factories and workshops in which the manufacture of articles of metal (not being machinery) is carried on, or who are employed in that class of work as outworkers. The Order is drawn so as to apply to the same classes of work (other than the manufacture of machinery), as are covered by the definition of "metal works" in paragraph (13) of the sixth schedule to the Act, with the inclusion, however, of workshops as well as of factories, but it will not apply to any of the other works (*e.g.*, blast furnaces, copper mills, iron mills, or foundries) defined in the other paragraphs of that schedule; nor will it apply to any work to which the Order of September 23rd, 1907, relating to the mixing, casting, or manufacture of brass or articles of brass and the electrodepositing of brass, applies. Any communication relating to the draft Order should be addressed before August 13th next to the Under Secretary of State, Home Office London, S.W.

CITY NOTES.

Buenos Ayres, Port and City Tramways, Ltd.

Mr. George Kitchin, presiding at the annual meeting, held at Salisbury House, E.C., last week, said there was an increase in receipts of £8,393 for the year, and the net profit was £6,764, compared with a loss of £1,148 in the previous year. As the profit only represented one-fifth of the debenture stock and bond interest, there was a debit balance for the year of £27,534, making the total debit £79,756. Only construction work that was absolutely necessary was being proceeded with. The chairman later referred to the difficulties which were mainly responsible for the high percentage of their working expenses. These difficulties could not be got rid of. They could not hope to materially alter the rough character of their traffic, and the high price paid for energy was a considerable handicap; they were under contract with the German Power Co. for a considerable term of years. It appeared that they would have to be satisfied with working expenses of a ratio of somewhere about 75 per cent. Last year the figure was 87·49. The improved management was beginning to make itself felt in the direction of reduction of expenses, but the fixed charges were abnormally heavy. They had had to borrow money to meet their obligations, but that could not continue, and they had a scheme in preparation which they would submit shortly for reducing the fixed charges and getting rid of large items on the credit side which did not represent tangible assets. The report was adopted.

British Continental Electricity Co., Ltd.

The directors' report on the position of the undertaking at the end of the year 1913-14 shows that after writing off £224 depreciation at the usual rates in respect of furniture, tools, meters, &c., and £200 depreciation of plant, the balance standing to the credit of revenue account, after deducting the interim dividend paid on the 5½ per cent. cumulative preference shares for the half-year ended October 31st, 1913, and including the amount brought forward, is £1,249, out of which has been paid an interim dividend at the rate of 3 per cent. per annum on the ordinary shares for the half-year ended October 31st, 1913, leaving £1,099, which is to be appropriated as follows:—Final dividend at the rate of 5½ per cent. per annum on the 5½ per cent. cumulative preference shares for the half-year ended April 30th, 1914, £275; final dividend at the rate of 4 per cent. per annum, free of income-tax, on the ordinary shares for the half-year ended April 30th, 1914 (making 3½ per cent. for the year), £200; addition to reserve fund, £300; leaving to be carried forward £324. £1,534 has been expended on capital account during the year, largely due to an extension of the company's network to serve the Madonna della Guardia district, which network has been completed since the close of the financial year, and shows every prospect of justifying the expenditure incurred thereon.

The Paris Tramways Co.

The report for 1913 of the *Compagnie des Tramways des Paris* states that a considerable portion of the works connected with the transformation of the tramways, was executed in 1911 and 1912 without, however, yielding tangible results. On the other hand the completion of certain sections in 1913 opened up access to the centre of the city and now permitted of the realisation on many lines of the advantages resulting from the reorganisation of the services. As far as concerns the electrification of the lines formerly worked by steam and battery cars, the report points out that the works comprised the installation of the overhead trolley on the whole of the suburban network and on a zone in Paris limited in general by the outer boulevards, whilst the conduit system was stipulated for elsewhere. The installation of the trolley had proceeded rapidly, and out of 112 miles of line for this method, 102 miles were already in operation. The mileage on the conduit system was to be 21.70, of which 12.40 miles had been completed. It had therefore been possible to discontinue the use of accumulator cars on all lines with the exception of three, and to bring the new service of cars to the two most important termini in the centre of Paris. The three lines still worked by battery cars were the two proceeding from the Pont de l'Europe and that from Puteaux to the Madeline, the latter of which was on the point of being brought into operation on the conduit system. 200 new motor cars had been placed in service.

The general course of working was satisfactory. The reorganisation had yielded good results, and the number of passengers carried increased by 8,940,000 over the preceding year. Not only so, but the cost of working per car kilometre had been reduced by 11 per cent, thus bringing the economy realised since the reorganisation was commenced up to 24 per cent. The number of car kilometres run advanced from 14,951,000 in 1912 to 16,211,000 last year, and the total receipts from £450,000 to £494,000 in the two years respectively, and the increase became of a more pronounced character in the early months of 1914, during which the working expenses per car kilometre were further reduced notwithstanding a large augmentation in the kilometres run. The net profits amounted to £88,000, and after placing 5 per cent. to the legal reserve fund, the balance has permitted of the payment of a dividend of 4 per cent. on the ordinary share capital of £2,200,000.

Marconi's Wireless Telegraph Co., Ltd.

Commendatore G. Marconi presided on Tuesday, at the Hotel Cecil, over the annual meeting. There was a large attendance of shareholders.

The Chairman, in moving the adoption of the report (Elec. Rev., p. 105), said he was afraid the report and figures had been somewhat disappointing, but judging from some of the criticisms which he had heard and read, he did not think that the full meaning of what was said in the report or the figures which it contained had been altogether appreciated. After the few remarks which he proposed to make upon them perhaps they would regard them with a little less pessimism. But he would like to preface what he was going to say about these matters by drawing their attention to the following facts:—(1) Although they had existed as a company for quite a number of years the wireless industry was a very young one; even now it was only in its infancy. (2) Their business could not be compared with any other; they did not trade in bales of wool or sacks of flour in which there was an almost unlimited market, their market was a somewhat limited one and their revenue was derived from three sources:—(1) Sales made mainly to governments and contracts entered into with them. (2) Dividends from their holdings in subsidiary companies, and (3) Receipts from telegraph services which they conducted or in which they were interested. With regard to the first, so long as they did a good proportion of all the business which governments offered, they could not complain. They could not do much in the way of creating business when the financial conditions of the world were unfavourable and every government was aiming at reducing its expenditure by avoiding any outlay which was not immediately essential. In the second case, they could give all the assistance in their power to their subsidiary companies, but they could not make them, and did not try to induce them, to pay bigger dividends than their directors thought prudent. These companies were all subject to much the same conditions which influenced their company, and they too were in the course of development and expansion. They took time to build up. As they improved so did their revenues. Thirdly, in regard to the telegraph service; they did a great deal of work, and last year they did a great deal of work from which the profits were to be derived in the future. They had more than once said that the principal revenue to be derived from wireless lay in the creation and working of telegraph services. And they had told them that the policy of the company was to build telegraph stations as far as possible for their own account under concessions or licences, and in cases where these could not be obtained, they would build them for others, they remaining interested in one form or another in the receipts. Whichever of these courses was adopted the stations had to be built and the telegraph services created, and both took time. Neither produced profits during the course of construction or creation, but they would, they trusted, insure to them sure and regular revenues in the future. To this they attached the greatest importance; but they recognised that their profits might vary considerably according to demand as regarded that section of their business which related to contracts and sales; but when they should have reached the stage of developed telegraph services at which they aimed, they hoped to be quite independent of the contract and sales section as regarded profits, without neglecting that part of their business. In the meantime it must be recognised that a considerable proportion of their work did not give them any immediate profit, unless they elected to sell outright or in substantial part. But that was not their policy. They preferred to build up a sound future even though they had an occasional year with a profit and loss account less favourable than they would all like to see it. As an example of what he meant, they had been engaged during the past year in the construction of their Welsh Trans-Atlantic stations. They constituted the most important work ever carried out by the company. They looked to them, in conjunction with those constructed simultaneously in America, to produce large and regular revenues both to the company and to the American company, in which of course they participated through their large shareholding in that company. Those stations were very nearly ready to start a direct telegraph service to New York. The Trans-Oceanic Wireless Telegraph Co., Ltd., would conduct that business; they held all the shares in that company; they could have sold them very easily they thought if they had wanted to and so reimbursed the money they had expended and made a substantial profit besides. This would have materially improved their profit and loss account for last year, but it would have been bad business indeed if, as they hoped, the company would earn *yearly* and for many years to come as much as or more in each year than the single profit they could have derived by an outright sale. For such reasons as these their actual profits for the year were less than they otherwise might have been, but their assets were materially improved by the addition of these securities, and at their par value, which they hoped and believed they were worth, they showed a substantial profit, but that profit not having been realised it was not carried to profit and loss account. If they realised, or whenever they might decide to realise, whatever sum might be produced above cost became available for distribution and would be included in the profit and loss account of the year, but not before; meantime it remained an asset and was treated in their accounts accordingly. In the balance sheet, the amount representing the

cost of shares in associated companies and patents, which was a very important asset, increased during last year to £1,298,744, which was £442,624 more than appeared in the accounts of the preceding year; the par value, however, represented by that increase was £826,637, and they hoped and believed that the additional interests acquired were worth at least par. If they were they would represent a profit of £384,012 when realised, but at present there had been no attempt to turn them into cash. They were subjected to some criticism and some of their shareholders would seem to be dissatisfied because they did not again set out particulars of shares in associated companies. He could assure them that the directors themselves regretted having to come to that decision; and in doing so it was not that they had any wish to keep information from the shareholders, but solely because they were all convinced it was not in their interests that the information should be made public. Much the same remarks applied in the profit and loss account under the item "By balance of contracts, sales and trading account." They did not give more information respecting that item because they were satisfied it would be against the shareholders' interests to do so, and for no other reason. With superior knowledge of the company's affairs that was their opinion and that was their advice. The directors had no personal interests to serve and no desire to keep anything from them and if, notwithstanding their advice, a majority of the shareholders wished all the details under both or either of these heads published it should be done in the future. But the board recommended reflection before they took such a decision. He could, however, inform them that the list published last year was practically unchanged. They had not sold any of their shares and he would like it known that they never dealt in the market in any shares in any of their subsidiary companies. They had never bought any such shares and except on some few occasions when they had received advantageous offers for blocks of shares which they had considered it wise to accept, they had no transactions of any kind. He made that statement because he frequently heard it stated that the company was buying or selling as the case might be in the market, which accounted for the rise or fall in shares. Whenever they heard such statements as these they could deny them with his authority—for he repeated that the company never dealt in any of its shares in any way whatsoever other than that which he had described. Having decided they ought not to publish the particulars of their holdings it seemed to them important that the shareholders should have some idea as to whether their shares, representing so important an item in the balance sheet, were worth their cost, at which they were taken into account. They therefore proceeded to make a careful valuation of them, taking the price at the 30th June last for all the shares quoted on the Stock Exchange, and on that day, the prices were perhaps lower than they had ever been before, and forming their best judgment upon those unquoted, and they had told them that that valuation exceeded the amount at which it stood in the accounts and according to their valuation, the amount in excess was considerable. If their shares were worth the figure at which the shareholdings and patents together stood in the balance sheet, their patents were not represented by any sum whatsoever. Turning to other figures in the balance sheet of the year, he thought they must agree the comparison was a favourable one. Sundry debtors showed an increase of £115,000. Stock at cost was nearly doubled, namely £151,141 as compared with £81,206, which was an indication of increased business in hand. When all these things were taken into consideration, although the actual realised profit for the year was disappointing, they would agree that the results of the year as a whole were good, and the company's position showed a marked improvement. Reverting for a moment to the profits for the year and the recommendation of a final dividend of 10 per cent., he would explain why the directors recommended this distribution. At the end of 1912 a sum of £146,726 was carried forward, after placing £100,000 to special reserve account. The object of carrying forward so large an amount instead of distributing it was admittedly for the purpose of averaging dividends. In those circumstances the directors were of opinion that unless they could say that it was essential at this moment for the purpose of the company's business that they should refrain from distributing the profits earned, the shareholders would have just cause of complaint if the directors did not use a part of the monies earned in the previous year for the purpose of averaging for which it was carried forward. In September, 1913, a circular was issued informing them of an arrangement which had been made for the acquisition by the company of the majority of the shares of the Compagnie Universelle de Telegraphie et de Telephonie sans Fil of France, which company not only commanded a valuable influence in certain foreign countries, but also owned the world-wide rights, other than those of Germany, of Professor Goldschmidt's inventions, including his high-frequency alternator, and in order to fulfil the company's programme they issued 250,000 new shares at the price of £3 5s. 0d., which was below the market value at the time, and at this price they were able to get the whole issue guaranteed. They did contemplate that the profit and loss account for the year would have shown a bigger realised profit, and they certainly did not expect to see their shares depreciate on the market as they had done lately, but for these fluctuations they were no more responsible to-day than they were some time back when movements were in the other direction. Speaking in a general way their business had suffered and their whole programme had become somewhat dislocated and retarded by the non-ratification of the contract they entered into with the Government in March, 1912. A long drawn out Parliamentary Committee followed and a hearing and world-wide publication were given to any witness who had something to say against the company and in favour of other systems and foreign interests; and notwithstanding their applications to be heard and the promises given to them that they should be given an opportunity to reply fully upon all matters before the committee closed, their managing director was never heard at all upon anything which related to the merits of the contract. And when a contract was eventually ratified, the construction of the Imperial stations had not progressed at the rate they had hoped and expected. They had every reason to believe that they should have been allowed to get to work on all the six stations simultaneously and had made all their preparations accordingly. They also expected to erect them with all speed possible, and contemplated that the whole might have been completed within 18 months of the ratification of the agreement which was what was contemplated in the contract. Besides being occasioned a great deal of additional expense, they were affected in other ways, not the least important of which was the non-receipt of their royalties and the effect the delay had upon their royalty period. These were matters which were receiving the most serious consideration of the board. He observed that the Postmaster-General had stated that some delay had been caused by reason of them suggesting an improvement. He could not admit that there was any reason whatsoever for delay on this account. Approval could and should have been given, in his opinion, within forty-eight hours. If the erection of the stations was delayed a few more years, there might be more improvements suggested, but they must not be told on that account that they were responsible for delay. He could not say more on this subject at the moment. He had referred already to the new Trans-Atlantic stations. They hoped to have these opened very soon now; the stations would have been completed ere this but for some imperfections in manufacture of material, which were being remedied. When this new means of direct communication with New York was established, they thought the true value of wireless telegraphy would be recognised, and so also the profits to be derived from it. Another important telegraph service about to be started was that between this country and Spain and the Canary Islands, which would of course also embrace a service to and from Spain and the Canary Islands and the United States of America and Canada. This service should make a material difference to the Spanish company in which they were largely interested. By reason of legal and other proceedings their managing director was prevented from visiting America and Canada as was his intention ever since the beginning of last year, and the progress of their companies in both countries had been hindered in consequence. It was responsible for the delay in the appointment of a manager in New York and for matters equally important as regards Canada. It was hoped that his visit might not have to be much longer deferred. They continued to maintain good relations with a number of foreign countries for whom they were engaged in carrying out important contracts and their works were kept well occupied. Early this year their 7777 patent expired in this country, but they owned nevertheless a number of very important patents, and to these they added very considerably during the last year. Some of these new patents might and they thought would prove to be of very great value indeed. Shareholders probably knew, but he wished to emphasize the fact, that at the present time whatever new patents the company became possessed of if they were his inventions or those of members of the staff, they did not cost the company anything at all beyond the expense of their research department and the cost of the fees for the patents themselves. One of the branches of their work which had made great progress during recent times was that of wireless telephony. He was enabled, with the valuable assistance afforded him by the Italian Government, to carry out some very important experiments and tests, which had assisted materially in their being now able to produce a practical standard set for wireless telephony over moderate distances. This was a first tangible step and should lead to further developments. He was now occupied in making the necessary arrangements to carry out tests between this country and America, from which he hoped to get some practical results before the end of the year. This was a new branch of their work which should be productive of a new and additional source of revenue, not only to the parent company but to all the subsidiaries, which, at present, had the advantage of all their inventions and work. He must now deal with a matter which affected them and the whole board—a matter too, which reflected more particularly upon the honour of their managing director. Unhappily, he was not at liberty without risking the charge that he was showing a want of respect to the Court, to speak with that freedom which he desired, and it was for that reason that he could only tell them in language which must necessarily be somewhat guarded about the action which Mr. Locker-Lampson, a Member of Parliament, and a Mr. P. E. Wright, had instituted against the board of this company and other persons. So far as the board other than the managing director were concerned the claim was of comparatively small importance. It depended upon what might fairly be regarded as technicalities which could have but comparatively small interest for

them. But with regard to their managing director a very different charge was made. It was alleged against him that he had been a party to frauds upon the company with the object and result of putting large sums into his own pocket. Defences had been delivered and these, he need hardly tell them, contained a categorical denial of all the charges. He might add a word as to the interest in the company of the two gentlemen who were bringing this action and preferring these charges. Mr. Lampson at the commencement of the proceedings was the registered holder of two shares, one preference and one ordinary. A few weeks afterwards he tempted fortune by acquiring a further 20 shares, and was thus to-day the holder of 22 shares. Mr. Wright was the registered holder of one share only. He was not, as a matter of fact, registered in respect of this cherished possession until after the writ was issued. But seriously, the fact remained that these two gentlemen had a combined interest of 23 shares in the capital of this great company which as they knew was a million and a half sterling. Possibly they were merely stalking horses for gentlemen with larger interests but less courage—gentlemen who for reasons at which they might guess, preferring discretion to valour, remained in obscurity. He was told that Mr. Locker Lampson and Mr. Wright had been and were industriously busying themselves in an endeavour to obtain the support of other shareholders. To what extent, if at all, their efforts had been successful, was a point upon which he desired complete enlightenment, and his method of obtaining it was by retiring from the board and offering himself for re-election. The managing director would do the same. It was not his turn to retire, and as for the managing director he had waived his privileges for he was never under an obligation to retire. He ought to mention that the Plaintiffs, through their Counsel, had openly declared in the Courts that expense in this action was not a matter of any consequence. The board entirely dissented from this view. But what more seriously concerned the board and the shareholders was the inevitable dislocation and interruption of the steady work of the company which must result when its officers were compelled to employ so considerable a part of their time and energies in resisting legal proceedings. The damage to their interests by the continuance of the proceedings by no means rested there, for the seeds of suspicion which had been sown bore fruit not only in this country but throughout the civilised globe. An opportunity was thus afforded to those who were antagonistic to the company of damaging its reputation and prestige with its chief customers —the various governments of the world. It would be within the recollection of many of them that when the managing director came to the company its affairs were far from satisfactory and its chances of reaching a dividend-paying stage seemed remote. It was, he hoped, hardly necessary for him to remind them of the great results which the managing director had achieved for them—it was his loyal devotion which they must thank for the commercial prosperity of the company and its great industrial position in the wireless world. Mainly upon his shoulders had fallen the great and complicated problems which almost daily presented themselves in a new industry. Scarcely a year ago they acknowledged his services in a worthy and generous spirit and he could not think their feelings towards him had altered. They should not permit themselves to be influenced by statements in the Press or by those whose interests were not the shareholders' interests. They might rest assured that all charges would be investigated by the Courts at the earliest moment possible—the fullest enquiry was courted and in the meantime he recommended them in their own interest to remain staunch to those who had guided the fortunes of the company through manifold difficulties. At this time domestic dissension was dangerous—undisguised enmity was displayed in more than one quarter and a united front was essential if the company was to enjoy that prosperity for which so stern a struggle has been fought. He was also reminded that it was due to their managing director that wireless telegraphy had become an important British industry, a matter which might be vital to the whole nation. It would otherwise have been entirely in foreign hands. He brought this position about by the aid of foreign capital at a time when no money could be found for the purpose in this country. It was he who was responsible for the great Imperial scheme of placing all the Dominions across the seas into wireless communication with each other, and it was due to him that a British company was able to carry out this work and that this country would possess the biggest and most powerful wireless stations in the world. Their great value might one day be put to a great practical and critical test; then perhaps there would be a true appreciation of the greatness of the work. Not only had their managing director turned their own work to account but he obtained the control for this British industry, of an important foreign invention and by so doing, he had given it in the face of contrary opinion, the opportunity of practical development, which it otherwise had very little prospect of receiving. And, finally, allow him to say a few words about himself—an invidious enough task since it compelled him to refer to his own services to the company. He could not refrain from telling them how bitterly he had felt the association of his name with those political quarrels with which they were all familiar and to all of which he was fortunately a stranger. Many times had he been tempted to return to Italy where the pleasures of his native land awaited him and where he could continue his scientific pursuits under ideal conditions and with the enthusiastic co-operation of the authorities, whether scientific, civil or military, and with the full and unstinted appreciation of his countrymen, independent of any party politics or political opinions. He had always had large interests in Italy derived from sources wholly unconnected at any time with this company, and if he were only to consider his personal interests he should return permanently to his country tomorrow and he could assure them that it would be to his advantage in every way to do so. He would return immediately were it not for a sense of duty and loyalty to his colleagues on the board and the wholehearted and sympathetic support which he had hitherto received from them all, and which he expected they would extend to him and to the managing director that day.

Mr. Godfrey Isaacs (managing director), in seconding the motion, said he did not wish to refer too much to the time and work and energy which he had given to the company's affairs since he joined it. The Chairman had told them something of the position in which he found the company when he came to it, and he had done his utmost independently of his own interests in furthering the interests of the company. When he joined the board the shares of the company were practically unsaleable at the price of 10/- or 14/-, and no dividend had been paid upon them. With the development of the company's business the shares rose materially in value and not unnaturally the holders of the shares took advantage of the high price and sold them. Consequently he was in the somewhat unfortunate position of being before a large body of shareholders who had bought their shares at a high price. With regard to the action pending against the company the Chairman had referred to him in terms loyal and appreciative, for which he was deeply sensitive. He had decided that in view of the extraordinary false rumours which were constantly circulating and the poisoned atmosphere with which he had been recently surrounded, it would be impossible for him to continue unless he had the complete confidence of the shareholders. For that reason he waived all his privileges as managing director, and he left it to them to say whether it was their wish or not that he should continue to direct their affairs.

Mr. R. Corry expressed the opinion that it would be a good thing if something could be done to restore the credit of the company.

Mr. S. Cole said that in consequence of the lack of candour on the part of the board he proposed as an amendment that the report and accounts be adjourned and a proper detailed balance sheet and profit and loss account be submitted to the shareholders. He asked how much of the profit for 1912 was applicable to dealing in shares and company promoting and how much was made in 1913. The speaker who was very imperfectly heard, asked for information of the company's holding in the French company, and further called attention to the fees paid to the directors who acted as directors of the subsidiary companies. He asked what profits the directors had made on the dealings of the company and its subsidiary companies since 1910. His criticism, he said, was directed not against the company but against its management.

Mr. G. Isaacs suggested that each speaker should give the amount of his holding. He found that Mr. Cole registered 5 bearer shares on Saturday.

Mr. J. Webb, who said he held 500 shares, remarked that he had come to criticise, but after the candid statements of the chairman and the managing director, he thought they would be very foolish people if they found fault with the directors. He believed they had a wonderful property and if they stuck to their chairman and directors they would carry them through. He heartily believed that Mr. Marconi was a genuine man.

Mr. H. Bright asked the managing director to deal with their criticism and not with their notions. He had not a word to say against the chairman, but they had to look at facts, and one fact was that there was a cloud of litigation at the present moment which one of their directors appeared to attract to his person like a magnet. The speaker proceeded to criticise what he termed "the obscurity of the balance sheet," and said he had never seen an auditor's certificate in which the auditors had taken greater trouble to protect themselves from future litigation. Why had they not seen the certificates of the shares owned by the company? Mr. Bright next touched on the American Marconi Co., and asked if a subscription of 5/- per share on 119,000 shares was not due from the English Co. to the American Co., and when was the sum going to be paid? The speaker proceeded to deal with the inflation of the shares of the English Co. in 1912, and said it was a common denominator in most of Mr. Isaacs's companies that they should have a sudden inflation of shares followed almost immediately by a sudden decline.

Mr. Isaacs: That matter was dealt with at the Central Criminal Court and has been settled with once and for all.

Mr. Bright returned to the same subject but the Chairman said he could not allow it. The shareholders must keep to the Marconi Co.

Mr. Bright said what they wanted was steady evolution and sober progress. Shareholders felt a great deal of favouritism had been shown in the company from time to time. If they got shares pushed up to inflated prices that was nice for the stock jobber and those in the know——

The Chairman again called the speaker to order and asked him to confine himself to the business of the company.

Mr. Bright again made reference to favouritism shown, by

which people who were "in the know" came also to deal in shares. In conclusion, he asked that the shareholders should be taken fully into the confidence of the board, and that the managing director should make every statement as candid as he could.

Mr. ARNOLD STATHAM said he had listened to the last speaker with the utmost indignation. What facts or evidence had been given and what right had he to assume that the shareholders suspected their own board? He claimed that the shareholders cherished no doubt of the integrity of Mr. Isaacs, and that the charges at the meeting were part of a conspiracy to bolster up actions which were pending. He was a strong Conservative and had fought an election, but he was absolutely ashamed of his party making political capital out of personalities. He appealed to the Chairman not to be unduly sensitive as none doubted his capacity and integrity.

Mr. VERDY pointed out that if they believed in the chairman they must believe in the managing director who was brought in by the chairman.

Mr. TARRINGTON, an Irish shareholder, addressed the meeting in a most excited manner and said the shareholders cast no reflection on Mr. Marconi, but the best man in the world fell amongst thieves. He represented the body of men who had lost. Would Mr. Isaacs tell them what he had made? (Cries of "Sit down.") He was an Irishman and would not sit down. (Laughter.) He had no hesitation in saying that Mr. Isaacs was a scoundrel. (Uproar and cries of "Sit down.") He was not going to sit down for the bullying of a lot of Saxons.

The CHAIRMAN said he could not allow that spirit to be introduced. He was part of an Irishman himself.

Mr. TARRINGTON proceeded to deal with the issue of the Marconi shares due, he said, to a misleading circular of the managing director; and then made a violent attach on the Lord Chief Justice.

The CHAIRMAN: If you proceed in that way, I shall exercise the powers of the chairman and have you removed.

Several other shareholders having spoken,

The CHAIRMAN said that most of the remarks and criticisms were concerned with the managing director personally. The managing director had much more knowledge of the business side of the company than he had, and he would ask him to reply. At the same time he could not but repeat what he had already said as to his appreciation of the honesty and straightforwardness of Mr. Isaacs. What he had heard there had not changed his opinion as to Mr. Isaacs' integrity.

Mr. GODFREY ISAACS said he did not understand that any specific charge had been made. The only thing was that Mr. Tarrington had called him a scoundrel. He could not disprove that, but he must leave it to the meeting to judge. He had also asked how much money the managing director had made by buying and selling shares. When he joined the company, having confidence in it, he did not hesitate to buy as many shares at the time as he could afford, and he bought them with the intention of holding them so long as he was associated with the company. He saw them go up to £9 15s.—a fact which he deplored—but he did not sell one of those shares, and he would have held the whole of the shares that day had it not been made clear to him by what was taking place that he was laying himself open to a series of sinister suggestions by being largely interested in the company. Therefore, when in the autumn of 1912 the market fell, he determined not to have a large holding in the company, and he sold some of his shares at a price of about £4, and he had never bought or sold a share in that company or any other from that day to this. Therefore whatever profit he had made he had made perfectly legitimately, and merely because the business developed as the result of work put into it. As regarded company promotions, they had made no money out of company promotions whatever. All those things were merely the class of rumour put about to damage the company by certain individuals who desired to damage it, and they were passed from one to another and very soon assumed an importance although there was not an atom of foundation behind them. It was true that in the balance sheet of the American Company it was stated that they had £119,000 shares. Although that was perfectly correct it was not quite a representation of the facts, because they had a large amount to their credit with the company and the two accounts had not been squared. If they had have been squared that item of 119,000 shares would not have appeared to their debit. Whatever circular he issued from the Marconi Company was issued with the full concurrence of the whole board, and the circular to which reference had been made expressed exactly what they believed to be true, and they held the opinion that day that there was nothing in the circular in any sense misleading. Mr. Isaacs then referred to the negotiations with regard to the Chinese contracts, and said that unfortunately by some means or other which they had not been able to fathom, a good deal of information got into the Press, and when he was asked he was obliged to inform the Press that the contracts had been sent forward to Pekin and might be signed at any moment. Since then, unfortunately, his and other statements had been copied into Pekin newspapers, with the result that the company had issued a full statement to the Press which no doubt they had all seen. In conclusion, Mr. Isaacs said there was no person whom he had done business with in the last 35 years who would echo one of the sinister suggestions an innuendoes against him that they had heard that day.

Mr. PEARS (of the firm of auditors) said the form of the certificate was the same as in previous years. The certificate, in his opinion, gave the information that shareholders should know. They could not see the certificates of shares which were in foreign countries, but they were fully satisfied that the shares were held for the company.

The motion for the adoption of the report was carried unanimously.

Mr. ARNOLD STATHAM proposed the re-election of the Chairman as a director, and this was carried with acclamation.

Mr. CORNWELL (Cork) proposed the re-election of Mr. Isaacs to the board, and this was carried with one dissentient.

An extraordinary meeting was afterwards held, at which a resolution was passed altering the Articles of Association so as to give the Board power to establish and support a fund for the benefit of employees of the company.

Underground Electric Railways Co. of London, Ltd.

ON Tuesday a petition by this company was heard by Mr. Justice Joyce, in the Chancery Division. Mr. Younger, K.C., for the company, said the object of the petitioners was very definite. Their object in abandoning powers was that they might become a trust company carrying on no constructive policy and no business operations, but merely holding large blocks of stock and paying dividends without reference to the actual value of the stock. It might possibly be shown that by converting themselves into a trust company they would be able in the future to distribute as dividends moneys that would not otherwise be distributable. But the creditors and debenture-holders were mainly interested in that, and there was no opposition. Apart from this question, however, the figures in the case were very large, and the directors did not want to have any serious responsibility where they felt there was any doubt. The position would, however, be regularised if the resolutions in question were confirmed.

His LORDSHIP: I don't see what harm I can do.

The resolutions were accordingly confirmed.

Prospectuses.—*S. Smith & Sons (Motor Accessories), Ltd.*—The list is to close to-day (Friday), in an issue at par of 50,000 ordinary shares of £1 each in this company, which was formed for the purpose of acquiring as a going concern as from March last, that part of the business of S. Smith & Son, Ltd., concerned with speedometers, carburettors, dynamos, self-starters and other motor accessories. The chief object in the formation of the company is to provide additional working capital to meet the demands of the business, and to provide funds for the production on a large scale of Smith's self-starters, which will shortly be placed on the market. A statement of past profits is given in the prospectus, and the directors estimate those of the future as being sufficient to pay not less than 10 per cent. dividend from the inception of the company.

Paris North-South Railway.—The Nord-Sud Underground Electric Railway, which had an average length of 8·75 miles in operation in 1913, reports gross receipts amounting to £400,000, as compared with £348,000 in 1912. After defraying general expenses, interest on loans and other charges, the net profits are returned at £78,000, as compared with £80,000 in the preceding year. It is proposed to pay a dividend of 5s. per £10 share on the capital of £3,000,000, being the same rate as in 1912.

Liverpool Overhead Railway Co. — The directors have declared interim dividends at the rate of 5 per cent. per annum on the preference shares, and 2½ per cent. per annum on the ordinary shares (for the half-year), against 2½ per cent. per annum for the corresponding period last year.

London and Suburban Traction Co., Ltd.—The directors have declared an interim dividend on the ordinary shares at the rate of 1 per cent. per annum for the six months to June 30th, and also the dividend on the 5 per cent. cumulative preference shares for the same period.

Stock Exchange Notices.—The Stock Exchange Committee has been asked to allow the following to be quoted in the Official List:—

Compania de Electricidad de la Provincia de Buenos Ayres, Ltd.—£900,000 5 per cent. first mortgage gold bonds of £20 each, Nos. 1 to 45,000 (renewed application).

County of London Electric Supply Co., Ltd.—Further issue of 6,000 ordinary shares of £10 each, fully paid, and 10,000 6 per cent. cumulative preference shares of £10 each, fully paid.

Central London Railway Co.—Interim dividend at the rate of 3 per cent. per annum on the undivided ordinary stock for the past half-year, and on the preferred ordinary stock 4 per cent. per annum.

City and South London Railway Co.—Interim dividend for the past half-year at full rate of 5 per cent. per annum on the preferred stocks of 1891, 1896, 1901, and 1903.

Kaministiquia Power Co.—A dividend at the rate of 6 per cent. per annum on the common shares for the quarter ending July 31st is announced.

Bournemouth and Poole Electricity Supply Co., Ltd.—Interim dividend on the ordinary shares at the rate of 5 per cent. per annum for the half-year to June 30th last.

St. James' and Pall Mall Electric Light Co., Ltd.—Interim dividend for the half-year ended June 30th, 1914, at the rate of 10 per cent. per annum on the ordinary shares.

The British Electric Traction Co., Ltd.

THE new capital will be as under if effect be given to the proposals contained in Mr. E. GARCKE'S recent circular to the stockholders:—

There are to be two classes of stock only, viz.:—

(*a*) 6 per cent. cumulative preference stock entitled to priority in a distribution of capital; but not to any further share in profits in capital.

(*b*) Ordinary stock entitled to all surplus profits and capital.

The 6 per cent. cumulative preference stock will be made up as follows:—

As now existing as per table given below ...	£403,592 10 0
Add amount of the present 7 per cent. non-cumulative preference stock to be converted into 6 per cent. cumulative preference stock	269,061 13 4
Total ...	£672,654 3 4

The new ordinary stock will be composed as under:—

Amount of existing 7 per cent. non-cumulative preference stock to be converted into ordinary stock	£538,123 6 8
Amount of existing preferred ordinary non-cumulative stock to be converted into ordinary stock	535,048 15 0
Amount of existing deferred ordinary stock to be converted into ordinary stock ...	199,951 10 0
Amount of existing income certificates ...	93,230 0 0
Total	£1,366,353 11 8

The authorised capital will consist of:—
£1,000,000 6 per cent. preference stock.
£2,000,000 ordinary stock.

Summarised, the new capital will therefore be:—

6 per cent. cumulative preference stock ...	£672,654 3 4
Ordinary stock	1,366,353 11 8
Total ...	£2,039,007 15 0

Note. The amount of existing stock and income certificates	£3,213,751 1 0
The new capital will be	2,039,007 15 0
Leaving amount which will be lost or surrendered by stockholders and income certificate holders as shown in the following table	£1,174,743 6 0

Class.	Present Capital. Description.	Amount. £	Changes proposed in scheme.		Amount which will be lost or surrendered by stockholders and income certificate holders under the scheme.
1.	6 per cent. cumulative preference stock ...	403,592 10 0			
2.	7 per cent. *non*-cumulative preference stock	807,185 0 0	p.c.	£	
			33⅓ of this class to be converted into class 1 =	269,061 13 4	
			66⅔ of this class to be converted into new ordinary stock ... ... =	538,123 6 8	
			100	807,185 0 0	
3.	6 per cent. preferred ordinary non-cumulative stock ...	1,070,097 10 0		£	
			To be reduced by 50 per cent. ... ... =	535,048 15 0	
			Remaining 50 per cent. to be converted into new ordinary stock ... ... =	535,048 15 0	
				1,070,097 10 0	£535,048 15 0
4.	Deferred ordinary stock	666,505 0 0		£	
			To be reduced by 70 per cent. ... ... =	466,553 10 0	
			Remaining 30 per cent. to be converted into new ordinary stock ... ... =	199,951 10 0	
				666,505 0 0	£466,553 10 0
	Total ...	£2,947,380 0 0			
Add	non-interest bearing income certificates redeemable out of profits only	£266,371 1 0		£	
			To be reduced by 65 per cent. ... ... =	173,141 1 0	
			Remaining 35 per cent. to be converted into new ordinary stock ... ... =	266,371 1 0	£173,141 1 0
				266,371 1 0	
Total capital and income certificates		£3,213,751 1 0	*of which will be lost or surrendered*		£1,174,743 6 0

Nairobi Electric Power and Lighting Co., Ltd.

THE annual meeting was held at the offices, 50, Mark Lane, E.C., on July 8th.

GENERAL SIR STANLEY EDWARDES, K.C.B., presided, and in moving the adoption of the report (ELEC. REV., p. 957, Vol. 74) said they had increased the expenditure on works by £1,345. Stocks on hand and in transit showed an increase of £757. Sundry debtors appeared as £3,992, a considerable increase of £1,763 over the figures of the previous year. The amount of outstanding debts at Nairobi was unusually large, due to special temporary circumstances. The issued share capital remained the same, while the issued debentures had increased from £16,700 to £19,000. The remainder of the ordinary shares were now in course of being issued. Sundry creditors at London included the item of £3,600 for arrears of cumulative preference dividends, all of which had since been paid off. Reserve account appeared for the first time in the balance sheet and consisted of £855 realised by the sale of property, and £1,145 appropriated from revenue account. As they were aware, the satisfactory results of last year's working had made it possible to clear off all arrears of dividend and they carried forward £414. Passing on to the revenue account, their principal source of income, the sale of current, had yielded an increase of £1,712. The installations and other work carried out by their contract department also showed an exceptional increase, which they did not anticipate being continued that year. Many of the items of expenditure showed considerable decreases, as was forecasted at their last annual meeting. The principal increases were in salaries and wages, due to an increased staff in their contract department; in legal expenses, due to the issue of new debentures replacing the original issue; and debenture interest, due to the increased issue. The London office expenses at £207 and directors' fees at £44 both showed material decreases. The net profit for the year, after payment of all charges and debenture interest, amounted to £4,984 against £2,643. Having cleared off their liability to the preference shareholders they started the year 1914 with a clean sheet before them. A year ago they hoped that if they had a very favourable year, that result might be attained. They had had such a year, and he was sure the shareholders would consider the accounts now presented to be very satisfactory. As mentioned in the report of the directors, the protracted negotiations with the Government had been concluded satisfactorily. The letters which had passed and which embodied the alterations, were in course of drafting into a new agreement by the colonial authorities. The company had made an exchange with the Government of the various small falls on sundry rivers granted by their original concession for the important falls situate on Thirka River, commencing some 10 miles below the Fort Hall Road, which were capable of being developed to the extent of a minimum of about 6,600 H.P. The company's concession was extended to 50 years, with the proviso that it continued thereafter by periods of five years until bought out by the Government or municipality at a market valuation of the plant and other assets of the undertaking. The Secretary of State for the Colonies had agreed to the alteration of the Customs Ordinance of the Protectorate so as to admit free of duty all necessary plant for the generation and distribution of electric current, which would be a material benefit to the company. Unfortunately, on account of the very protracted nature of those negotiations, it had been impossible for the company to cope with the increased demand for current in a way that it would have liked to meet the needs of the case. Immediately the details were agreed upon by the company and the local Government, and approved by the Secretary of State for the Colonies, steps were taken to deal with the situation, and a steam engine suitable for driving the spare generator at the present power station had been ordered, and was expected to be shipped at the end of this month. It was anticipated that this would deal with the increase of load until the new water power plant for the falls on the Thirka River was installed. It was proposed to utilise these new falls without delay by embarking on a scheme which would give a minimum of 2,000 H.P. in the driest season; and it was hoped, with the financial arrangements that the directors had in view, to commence by laying down a new plant of a capacity of 750 KW., and then to remove the present plant of 360 KW. to the new station. The increases due to the rapid

strides in the demand for current would probably necessitate an increase of the share capital, and the directors anticipated that their proposals on this matter would be submitted to the shareholders at an early date. The contingent liability mentioned in the previous year's balance sheet, being the cumulative preference dividends at 6 per cent. per annum, had been paid off by the declaration of interim dividends, as soon as the accounts for 1913 showed the same to be justified, and the directors anticipated commencing to declare regular half-yearly interim dividends on both classes of shares as soon as possible after the results for the respective half-years came to hand. The original ordinary shareholders had now waited seven years without any dividend, but developing their business, and the directors were very pleased that the time had come when they would begin to get the just reward of their patience and enterprise.

Mr. A. W. MAYO-ROBSON, C.V.O., seconded the resolution, which was carried.

County of Dorset Electric Supply Co., Ltd.

DR. J. A. HOSKER presided on June 15th at the first ordinary general meeting, held at Moorgate Court, E.C. He said that no substantial revenue was included in the report to December, 1913, because the Dorchester undertaking had then only been running two months and Blandford three weeks, while Swanage supply was not commenced. The progress down to date showed the number of consumers in their four towns as follows:—Lyme Regis, 120; Dorchester, 57; Swanage, 50; Blandford, 29. The aggregate of the whole of the towns was the equivalent of 6,411 thirty watt lamps; thus very satisfactory progress was being made. At Blandford the Council had asked them to submit a scheme for lighting the Corn Exchange. The initial cost of wiring had an intimate bearing upon their progress, and they hoped soon to complete arrangements for free wiring on a quarterly rental basis. It would mean considerable outlay, and it might be policy to do it independently through an electrical contractor. New plant had been installed at the three stations under the supervision of Dr. Purves, the consulting engineer. The Lyme Regis undertaking had now been working for four years, and its first year under the County of Dorset Company had been its best, giving the County Company 10 per cent. upon its investment. Swanage ought to exceed what Lyme Regis could do. A scheme for Wimborne and Broadstone was under consideration, and Sherborne and other towns would follow later. The company would need at least another £15,000 capital for these schemes, and would raise it by an issue of ordinary and preference shares. The contractors (Messrs. Callender's Co. and Messrs. Crompton and Co.), and the engineers and staff, were thanked for the manner in which they had carried out their work.

Chili Telephone Co., Ltd.

THE annual meeting was held on July 15th at 42, Old Broad Street, E.C., Mr. GEORGE KEITH presiding.

In proposing the adoption of the report (ELEC REV., p. 64) the CHAIRMAN, after alluding with regret to the death of Mr. F. W. Jones, one of the original directors, and the retirement from the board through ill-health of the Hon. Herbert T. Allsopp, said he was pleased to report that the business of the company had made good progress during the year, although the increase did not come out so large as it did for the preceding year. The general state of trade in Chili was adversely affected in the northern districts by the price of nitrate, and in the central and southern districts by failure of the crops and an outbreak of disease among the cattle. There was also a serious shortage of money, and trade generally was very restricted. Notwithstanding those adverse circumstances there was an increase of about 11 per cent. in the revenue of the company. The working expenses had also, unfortunately, increased in a larger proportion, and they amounted to 51 per cent. of the revenue, or 2 per cent. more than last year. That increase in working expenses was principally due to higher salaries and wages due to the rise in the cost of living in Chili. The average rate of exchange for the year was about 9¼d., or ¼d. less than in the previous year; so that the increase in net revenue had been more than required to compensate for the low value of the currency. The income of the business in Chili when converted into sterling showed a small decrease of £169, the total amounting to £62,497. The total expenditure had increased by £576. The result of the year's business was a credit balance of £57,244, of which £15,683 was expended in Chili on replacement and renewals to plant and had been charged direct to revenue. An interim dividend of 3 per cent. was paid last January, and, after placing £15,106 to the reserve, the directors recommended a final dividend of 5 per cent., carrying forward £3,956, as compared with £3,901 brought forward. The capital expenditure account had increased by £16,724 expended in Chili during the year in increasing and extending the property. Everything considered, he thought they might be satisfied with the result of the year's business. Chili continued to suffer from the fluctuations of the value of its paper currency. In January last the exchange fell below 9d., and now stood at 9¾d. A proposal was before Congress for fixing the value of the Chilian paper dollar at 10d., and if that became law and could be successfully carried out it would be of immense advantage to the commercial and economic interests of the country. The business of the company continued to progress favourably; the property and plant was kept up to a high standard, and every attention was being given to provide the authorities and the public with an efficient and satisfactory service.

Mr. E. B. BUTLER-HENDERSON seconded the motion.

Replying to a shareholder, the CHAIRMAN said the reason of their revenue not having increased last year was solely on account of the fall in the value of the dollar. As he had said, at one time it fell below 9d., and it came out on the average ¼d. less than in the previous year. What it really meant was that their customers had got the benefit of the progress made last year owing to the fall in exchange.

The report was adopted.

Continental.—BELGIUM.—The balance-sheet of the Société Belge pour l'Eclairage Public par l'Electricité (système Tudor), of Brussels, for the last financial year, shows a profit of £1,381.

GERMANY.—The Brown, Boveri Co., of Baden, is declaring a dividend of 9 per cent. for the last financial year, as compared with only 8 per cent. for the preceding 12 months.

FRANCE.—Among the new electrical companies recently formed in France are the Société de l'Electricité de Wambaix, formed to establish a small central electric lighting station at Wambaix (Nord), and the Société le Nord Triphasé, organised at Valenciennes, with a capital of £13,000.

The balance-sheet of the Société des Accumulateurs Tudor, of Paris, for the last financial year shows a net profit of £20,700.

Brazilian Traction, Light and Power Co., Ltd.—The directors have declared a dividend of 1½ per cent. on the issued ordinary capital stock. A circular was issued to the shareholders last week stating that there was not the least foundation for the various rumours, or any ground for uneasiness, with reference to the company's affairs. "The operation of the company's business is very satisfactory. The earnings are steadily increasing, and the outlook and prospects in all departments are good." Lengthy statements have been circulated both by the Brazilian company and by Messrs. Guinle & Co. concerning the competition that the latter will offer next year through their Companhia Brazileira de Energia Electrica, in Rio de Janeiro.

W. & T. Avery, Ltd.—The directors announce for the half-year ended March a dividend at the rate of 15 per cent. per annum, making, with the interim dividend, 15 per cent. per annum, placing £11,500 to reserve, and carrying forward £9,997.

Companies Struck Off the Register.—The following companies have been struck off the Register, and are accordingly dissolved:—

Aluminium Syndicate.
Bombay Hydro-Electric Syndicate.
Pearson Fire Alarm.
Titan Vacuum Cleaner Syndicate.

Calcutta Electric Supply Corporation, Ltd.—The number of units delivered to consumers, during the four weeks ended April 24th, 1914, amounted to 1,260,697, compared with 1,204,906 units in the corresponding four weeks of 1913. The figures for five weeks ended May 29th, are 1,645,309 this year, compared with 1,478,251 in 1913.

Metropolitan District Railway Co.—For past half-year an interim dividend at rate of 3 per cent. per annum on the second preference stock is announced.

Betulander Telephone Co.—The *Financial Times*, after referring to the Betulander automatic telephone system, says: "In all probability a public issue of shares will be made in the near future."

Aluminium Corporation, Ltd.—The resolutions passed at a previous meeting were confirmed at an extraordinary meeting held on 16th inst.

London Electric Railway Co.—Interim dividend for the half year ended June 30th at rate of 1 per cent. per annum on ordinary shares.

Montreal Light, Heat and Power Co.—A dividend of 2½ per cent. for the quarter ending July 31st is announced.

STOCKS AND SHARES.

Tuesday Evening.

POLITICS persist in oppressing prices. There seems to be no disentangling of the one from the other, but this week the influence has so far been beneficent, and hopes took Consols with them as they ran high, that peace might spring from the Buckingham Palace Conference. There are better prices in the markets connected with Mexican matters. Marconis have been wildly fluctuating. Stock Exchange humourists invented a little joke to the effect that Tuesday's Conference was adjourned at noon in order to allow a certain prominent Minister to attend the Marconi meeting held on that day, and the jest enlivened depression caused by rumours of war between Austria and Servia. It is the Mexican issues that make the best showing in our lists. The resignation of General Huerta, although suspiciously sudden, fanned the smouldering impression that the civil war, rebellion, or whatever the con-

fusion may be called, approaches its conclusion. As it has been pointed out frequently before, the amount of physical damage inflicted upon private property appears to be surprisingly small, and the market in Mexican Utility issues displays rises ranging from one to six points. The principal gain Mexican Light and Power bonds secured. Prices were re-adjusted to the cheerfuller conditions with comparatively little stock changing hands. We don't want to be doleful, but disappointing news would certainly put down quotations again.

Shawinigan Water capital stock recovered 1½, and Montreal Light and Power reacted 3 after its rise of twice as much. The Canadian companies continue steady payment of their usual dividends, thus counteracting to some extent the nervousness that still surrounds many Canadian investments. It is universally acknowledged that the Dominion depends more than ever, this year, upon a bumper harvest in order to provide the ready money Canada badly needs even yet. Happily, indications point to the crop being a bountiful one, so far as may be gleaned from information supplied by the people most interested.

Battles royal are being fought out over Brazilian Traction shares. Financial difficulties in Berlin, Brussels and Paris combined to force down the price to 71½ the other day. Within a short time it had rallied to 77, and stands, as we write, at 75. The company's emphatic denials of vague market reports, and the assertion that all was going well, formed the motive-power for the recovery. On the other hand, it is considered practically certhat the company will encounter competition in Rio de Janeiro, as soon as its present profitable concession expires. The return at the present rate of dividend is about 8 per cent., and the inter-Bourse character of the shares renders them one of the liveliest spots in the Stock Exchange.

It is humdrum work to write about English Electricity Supply shares after mentioning the volatile Brazilian Tractions. The market is very firm, however, and there are half-a-dozen issues $\frac{1}{16}$ to $\frac{1}{8}$ better. Two or three Debentures are rather harder. The curious will observe with interest that the Gas Light and Coke Company has declared a final dividend for the past year of £4 17s. 4d. per cent., carrying forward £535,400. The dividend is unchanged, and the carry forward about £80,000 less than at the corresponding period in 1913.

Dog days are hardly conducive to financial work—or to any other except journalism—but some kind of announcement is quite on the cards before long in connection with the delayed plans for London's Electricity Super-Company.

The electric railways came first into the dividend field in respect of the June half-year. The Metropolitan District announces 3 per cent. on its Second Preference stock, which is an improvement of ½ per cent., and better than the market authorities expected. This stock is all held privately at present, and save for a rise of ¼ in District Ordinary, the declaration has not affected prices. London Electric Railways is paying 1 per cent. on the Ordinary shares, repeating last year's performance, and Underground Electric £10 shares have hardened a shade. City and South London Preferences are to receive their full 5 per cent., but nothing is declared on the Ordinary stock, which got ¼ per cent. 12 months ago. The Central London's 3 per cent. is the same as before.

Railway affairs are more unsettled even than usual, because the Conciliation Board agreements expire in October, and it is plain enough that the men mean to make a bold bid for substantial rises as the price of their consent to renewal of the arrangements. Indeed, threats are already in the air of National Strike. So quotations move down a little, or up a little less, more in sympathy with the conditions affecting Consols than from any public interest, this being well-nigh at a standstill in view of labour eventualities.

London and Suburban Tractions gained further small fractions upon the dividend announced of 1 per cent. on the Ordinary. London United Tramways Debenture stock has receded a point, the opinion being frequently heard that tramways nowadays stand little chance against the all-triumphant motor-omnibuses. In the Stock Exchange it is stated that the British Electric Traction Company is carrying the war into the enemy's camp and establishing remunerative motor-bus routes of its own. Meantime, discussion proceeds with heat around the company's preliminary proposals for capital reorganisation, and the crux of the argument concerns the suggestions advanced in respect of the 7 per cent. non-cumulative Preference stock—a very Tyrone in the present situation.

Marconis advanced to 2½ on bear repurchases, the Ordinary and Preference recovering about a half of the previous week's fall. After the meeting, however, the Ordinary dropped back to 2. Market men contend that only by financial miracle can the 20 per cent. dividend be maintained, and that the current price is still too high, in the light of the report. It deserves to be noted that the Preference shares carry a cumulative 7 per cent. Preference dividend, and that they divide profits with the Ordinary after the latter have received 10 per cent. An exchange from Ordinary into Preference is therefore considered by some to be a sound proposition, as to which, however, it may be remarked that both classes move together, as a rule, so that if the Ordinary come down, the Preference will probably bear them company. The meeting proved less acrimonious than was expected; it lasted nearly two hours, and the retiring directors were duly re-elected. Canadians at 5s. 9d. and Americans at 11s. keep fairly steady.

Cable issues remain amongst the firmest in the Stock Exchange. Eastern Extensions are ½ higher: so are Globe Preference. British Insulated added 5s. to their big rise of the previous week. Anglo-American Preferred is up ½, while New York Telephone bonds improved similarly, West India and Panama Ordinary hardened to 27s. 6d., and the market, as a whole, exhibits pronounced strength. Manufacturing shares are steady as a whole, though Electric Constructions drooped to $\frac{9}{16}$, and Willans Preference is down by a point. Edison & Swan "A" shares changed hands at 1s. 3d. last Monday. The Rubber share market is quiescent, and this week's auction sales at Mincing Lane failed to quicken interest in prices.

MARKET QUOTATIONS.

It should be remembered, in making use of the figures appearing in the following list, that in some cases the prices are only general, and they may vary according to quantities and other circumstances.

Wednesday, July 22nd.

CHEMICALS, &c.		Latest Price.	Fortnight's Inc. or Dec.
a Acid, Hydrochloric	per cwt.	5/-	..
a " Nitric	"	22/-	..
a " Oxalic	per lb.	2¾d.	..
a " Sulphuric	per cwt.	5/6	..
a Ammoniac Sal	"	42/-	..
a Ammonia, Muriate (large crystal)	per ton	£29	..
a Bleaching powder	"	£6 5	..
a Bisulphide of Carbon	"	£18	..
a Borax	"	£17 10	..
a Copper Sulphate	"	£20 10	10/- dec.
a Lead, Nitrate	"	£28 10	..
a " White Sugar	"	£27 10	..
a " Peroxide	"	£89	..
c Methylated Spirit	per gal.	2/6	..
a Potassium, Bichromate, in casks	per lb.	8½d.	..
a Potash, Caustic (88/90 %) ..	per ton	£22 10	..
a " Chlorate	per lb.	8½d.	..
a " Perchlorate	"	8½d.	..
a Potassium, Cyanide (98/100 %) ..	"	7½d.	..
(for mining purposes only)			
a Shellac	per cwt.	65/-	..
a Sulphate of Magnesia	per ton	£4 10	..
a Sulphur, Sublimed Flowers ..	"	£8 10	..
a " Recovered	"	£5 10	..
a " Lump	"	£5 5	..
a Soda, Caustic (white 70/72 %) ..	"	£10	..
a " Chlorate	per lb.	8½d.	..
a " Crystals	per ton	£3 5	..
a Sodium Bichromate, casks ..	per lb.	8d.	..
METALS, &c.			
b Aluminium Ingots, in ton lots ..	per ton	£86	..
b " Wire, in ton lots (1 to 14 S.W.G.)	"	£107 6 8	..
b " Sheet, in ton lots ..	"	£112	..
g Babbitt's metal ingots	"	£60 to £221	..
c Brass (rolled metal 2" to 12" basis)	per lb.	7½d.	..
c " Tube (brazed)	"	9¾d.	..
c " " (solid drawn)	"	7¾d.	..
c " Wire, basis	"	7½d.	..
c Copper Tubes (brazed)	"	9¾d.	..
c " " (solid drawn) ..	"	9⅜d.	..
g " Bars (best selected) ..	per ton	£77	£1 dec.
g " Sheet	"	£77	£1 dec.
g " Rod	"	£77	£1 dec.
d " (Electrolytic) Bars ..	"	£63 10	10/- dec.
d " " Sheets ..	"	£82	10/- dec.
d " " Rods ..	"	£69 10	10/- dec.
d " " H.C. Wire	per lb.	8$\frac{7}{16}$d.	$\frac{1}{16}$d. dec.
f Ebonite Rod	"	4/6	..
f " Sheet	"	4/-	..
a German Silver Wire	"	1/6	..
h Gutta-percha, fine	"	6/10	..
h India-rubber, Para fine	"	2/11½	1½d. inc.
f Iron Pig (Cleveland warrants) ..	per ton	51/4	¼d. inc.
f " Wire, galv. No. 8, P.O. qual.	"	£14	..
g Lead, English Pig	"	£19 12 6	2/6 dec.
m Manganin Wire No. 28	per lb.	6/6	..
g Mercury	per bot.	£6 15	..
e Mica (in original cases) small ..	per lb.	4d. to 2/6	dec.
e " " " medium	"	8/- to 5/-	dec.
e " " " large ..	"	6/6 to 10/6 & up.	dec.
o Nickel, sheet, wire, &c.	"	8/6 to 4/6 nom	..
p Phosphor Bronze, plain castings	"	1/1 to 1/3½	..
p " " rolled bars & rods	"	1/0½ to 1/3	..
p " " rolled strip & sheet	"	1/2½ to 1/5½	..
o Platinum	per oz.	185/-	..
d Silicium Bronze Wire	per lb.	10½d.	..
r Steel, Magnet, in bars	per ton	£56	..
g Tin, Block (English)	"	£145 10 to £146 10	£1 dec.
n " Wire, Nos. 1 to 16	per lb.	2/8	..
p White Anti-friction Metals ..	per ton	£44 to £194	..
k Zinc, Sh't (Vieille Montagne bnd.)	"	£25 2 6	..

Quotations supplied by—

a G. Boor & Co.
b The British Aluminium Co., Ltd.
c Thos. Bolson & Sons, Ltd.
d Frederick Smith & Co.
e F. Wiggins & Sons.
f India-Rubber, Gutta-Percha and Telegraph Works Co., Ltd.
g James & Shakspeare.
h Edward Till & Co.
j Bolling & Lowe.
k Morris Ashby, Ltd.
l Richard Johnson & Nephew, Ltd.
m W. T. Glover & Co., Ltd.
n P. Ormiston & Sons
o Johnson, Matthey & Co., Ltd.
p
r W. F. Dennis & Co.

Japan.—The Keihin Electric Tramway Co., of Tokio, reports a net profit, including the amount brought forward, of £17,259 for the six months ending with March 31st last. Of this sum, £1,600 is being placed to reserve, and £800 accorded to the directors and auditors; the shareholders are receiving a dividend at the rate of 6 per cent. per annum, which absorbs £12,240, leaving £2,619 to be carried forward.

SHARE LIST OF ELECTRICAL COMPANIES.

ELECTRIC RAILWAYS AND TRAMWAYS.—HOME.

NAME.	Stock or Share.	Dividends for		Closing Quotations July 21st.	Rise + or Fall —	Present Yield p.c.
	*	1912.	1913.			£ s. d.
Bath Trams, Pref. Ord.	1	Nil	..	⅜ — ½	..	Nil
Do. 5 % Pref.	1	5	5	13/16 — 15/16 xd	..	6 19 0
Do. 4½ % Deb.	100	4½	4½	70 — 75	..	6 0 0
Brit. Elec. Trac., 6 % Pref.	100	..	..	17 — 19	..	..
Do. Do. Deferred	100	..	..	10 — 12	..	..
Do. Do. 6 % Cum. Pr'f.	100	6	6	85 — 89	..	6 11 2
Do. 7 % Non-Cum. Pr'f.	100	3	3½	54 — 57 xd	..	6 2 10
Do. 5 % Perp. Deb.	100	5	5	91 — 98	..	5 7 5
Do. 4½ % 2nd Deb.	100	4½	4½	77 — 79	..	5 14 0
Central London Railway, Ord.	100	3	3	57 — 62	..	4 16 9
Do. Gtd. Assented	100	..	4	83 — 84	..	4 15 3
Do. Pref.	100	4	4	68 — 78	..	5 9 7
Do. Gtd. Assented	100	..	4	84 — 86	..	4 13 0
Do. Def.	100	2	2	40 — 45	..	4 9 0
Do. Gtd. Assented	100	..	4	80 — 82	..	4 17 7
Do. 4 % Deb.	100	4	4	95 — 97	..	4 2 6
City & S. London, 5 % Pref., 1891	100	5	5	95 — 97	..	5 3 1
Do. Do. 1896	100	5	5	91 — 94	..	5 6 5
Do. Do. 1901	100	5	5	89 — 92	..	5 8 8
Do. Do. 1908	100	5	5	89 — 92	..	5 8 8
Do. 4 % Deb.	100	4	4	86 — 88	..	4 11 0
Hastings Trams, 6 % Pref.	1	6	6†	⅝ — ⅞	..	8 6 8
Do. 4½ % Deb.	100	4½	4½	65 — 70	..	6 8 7
Isle of Thanet Trams, 5 % Pref.	5	2½	3	2 — 2¼	..	6 0 0
Do. 4 % Deb.	100	4	4	71 — 76	..	5 2 7
Lancashire United, 5 % Deb.	100	5	5	84½ — 86½	..	5 15 4
London and Suburban, Ord.	1	..	1	1/32 — 3/32	..	3 10 10
Do. Do. 5 % Cum. Pref.	1	..	5†	3/32 — 5/32	+1/32	7 12 8
Do. Do. 4½ % 1st Deb.	100	4½	4½	78 — 78	—1	5 15 5
London Elec. Railways, 4 % Deb.	100	4	4	88 — 90	..	4 9 0
London United Trams, 4 % Deb.	100	4	4	53 — 57	—1	7 0 4
Metropolitan Railway Consol.	100	1⅝	1⅝	40¼ — 41	— 1/4	3 19 3
Do. Surplus Lands	100	2½	2½	62 — 64	..	4 6 0
Do. 3½ % Deb.	100	3½	3½	86 — 88	..	3 18 7
Do. 3½ % Pref.	100	3½	3½	82 — 84	..	4 3 4
Do. 3½ % Con. Pref.	100	3½	3½	79 — 81	..	4 6 4
Metropolitan District Ord.	100	Nil	..	25½ — 26	+ ½	Nil
Do. 6 % Deb.	100	6	6	136 —139	..	4 6 0
Do. 4 % Deb.	100	4	4	91 — 93	..	4 6 0
Do. 4 % Prior Lien	100	4	4	96 — 97	..	4 2 6
Do. 4½ % First Pref.	100	4½	4½	83 — 86	..	5 4 8
Do. 3½ % Gtd.	100	3½	3½	74 — 76	..	4 12 1
Metro. Elec. Trams, 4½ % Deb.	100	4½	4½	84 — 87	..	5 3 6
Do. 5 % Deb.	100	5	5	85½ — 88½	..	5 13 0
Potteries, Ord.	1	3½	3½	⅜ — ⅝	..	8 12 10
Do. 5 % Pref.	1	5	5	⅞ — 1 1/32	..	7 12 8
Do. 4½ % Deb.	100	4½	4½	81½ — 84½	..	5 6 2
South Metro. Trams, 4 % Deb.	100	4	4	64 — 68	..	5 17 8
Underground Elec. Railways	10	..	..	3 — 3⅛	+ ⅛	Nil
Do. "A"	1/-	..	..	3/32 — 1/16	..	Nil
Do. 6 % First Cum. Inc. Deb.	100	6	6	117 —119	+1	5 0 10
Do. 4½ % Bonds	100	4½	4½	99 —101	..	4 9 0
Do. 6 % Income	100	6	6	90 — 91	—½	6 11 10
Yorkshire (West Riding), Ord.	5	Nil	Nil	1/32 — 3/32	..	Nil
Do. 6 % Pref.	5	8	4	4⅛ — 4⅜	..	4 6 6
Do. 4½ % Deb.	100	4½	4½	84 — 87	..	5 4 8

ELECTRIC RAILWAYS AND TRAMWAYS.—COLONIAL AND FOREIGN.

Anglo-Arg. Trams, 1st Pref.	5	5½	5½	4⅜ — 5	..	5 10 0
Do. 2nd Pref.	5	5½	5½	4⅛ — 4⅜	..	6 5 9
Do. 4 % Deb.	100	4	4	90 — 92	..	4 7 0
Do. 4½ % Deb.	100	4½	4½	96 — 99 xd	..	4 11 0
Do. 5 % Deb.	100	5	5	95 — 97	..	5 3 0
Auckland Trams, 5 % Deb.	100	5	5	101 —104 xd	..	4 16 8
Bombay Elec. S. & Trams, Pref.	10	6	6	11 — 11⅜	..	5 2 2
Do. 4½ % Deb.	100	4½	4½	96 — 97	..	4 12 9
Do. 5 % 2nd Deb.	100	5	5	99 —101	..	4 19 0
Brazilian Traction, Light and Power	$100	6	6†	74 — 76	+2	7 18 0
Brisbane Trams Invt., Ord.	5	8	8	7⅛ — 7⅜	..	5 8 3
Do. 5 % Pref.	5	5	5	4⅞ — 5⅛	..	4 15 3
Do. 4½ % Deb.	100	4½	4½	100 —103	+1	4 7 5
B. Columbia Elec. Rly., Def.	100	8	8†	106 —110	..	7 5 6
Do. Pref. Ord.	100	6	6	103 —107	..	5 12 1
Do. 5 % Pref.	100	5	5	102½ —105½ xd	..	4 14 7
Do. 4½ % 1st Mort. Deb.	40	4½	4½	98 —101	..	4 9 0
Do. 4½ % Vancouver Deb.	100	4½	4½	92 — 96 xd	..	4 13 9
Do. 4½ % Con. Deb.	100	4½	4½	96 — 98	+ ½	4 6 9
Calcutta Trams, Ord.	5	7½	9½	7⅛ — 7⅜	+ ⅛	6 4 9
Do. 5 % Pref.	5	5	5	4 3/32 — 5 5/32	+ 1/32	4 16 5
Do. 4½ % Deb.	100	4½	4½	98 —101	+1	4 :0
Cape Electric Trams	1	5	5	⅝ — ¾	..	6 13 4
City Buenos Aires Trams (1904)	5	5	5	5⅜ — 5⅝	..	4 9 0
Do. 4 % Deb.	100	4	4	95 —100	..	4 0 0
Colombo Elec. Tr. & Lt., 5 % Deb.	100	5	5	93 — 97	+2	5 3 0
Havana Elec. Rly., 5 % Bonds	$1000	5	5	91 — 96	..	5 5 8
Kalgoorlie El. Trams 5% A Deb.	100	5	5	82 — 87	..	5 15 0
Do. 6 % B Deb.	100	3	..	10 — 20	..	Nil
La Plata Elec. Trams, Ord.	1	..	..	1/32 — 1/16	..	..
Do. Pref.	1	4½d.	6	3/32 — 1/8	..	6 5 0
Lisbon Elec. Trams, Ord.	1	6	6	1⅜ — 1⅝	..	4 9 3
Do. 6 % Pref.	1	6	6	1 — 1⅛	..	4 16 0
Do. 5 % Deb.	100	5	5	92½ — 97½ xd	..	5 2 6
Madras Elec. Tr., 6% Cum. Pref.	5	6	6	4¼ — 5⅛	..	5 14 3
" Elec. Tr. (1904), Deb.	100	5	5	99 —101	..	4 19 0
Manaos Trams & Lt., 1st Deb.	100	5	5	75½ — 78½	..	6 7 5
Manila Elec. R. and Ltg., Bonds	$1000	5	5	99 —101	— ½	4 19 0
Mexico Trams Com	$100	7	7	72 — 76	+1	..
Do. Gen. Con. 5 % Bonds	..	5	5	84 — 88	+4	5 13 8
Do. 6 % Bonds	100	6	6	77 — 81	+4	7 8 2
Para Elec. Rlys. & Lt., Ord.	5	10	10	4 — 4½	..	11 2
Do. 6 % Pref.	5	6	6	4 — 4½	..	6 13
Do. 5 % 1st Deb.	100	5	5	88 — 91	..	5 10
Rangoon El. Tr. & Sup., Pref.	5	6	6	5 — 5½	..	5 9 1
Do. 4½ % 1st Deb.	100	4½	4½	94 — 96	..	4 13 9
Rio de Janeiro Trams, 1st Mort. 5 % Bonds	..	5	5	97 — 9	+ ½	5 1 0
Do. 5 % Mort. Bonds	..	5	5	89½ — 91½	+1	5 9 3
Sao Paulo Tram., Lt. and P. 5 % 1st Deb.	$500	5	5	97 —101	..	4 19 0
Singapore Trams, 5 % Deb.	100	5	5	88 — 92	..	5 8 8
Southern El. Tr. B.A., 5 % Deb.	100	5	5	98 —100	..	5 0 0
Un. Elec. Trams Monte Video	5	7	7	4½ — 4⅝	..	7 7 4
Do. 6 % Pref.	5	6	6	4⅜ — 5⅛	..	5 17 3
Do. 5 % 1st Deb.	100	5	5	95 — 97	..	5 3 0
Winnipeg Elec. Rly., 4½ % Deb.	100	4½	4½	93½ — 95½	..	4 14 3

ELECTRICITY SUPPLY AND POWER COMPANIES.—HOME.

Bournemouth & Poole, Ord.	10	6	7	10 — 11	..	6 7 4
Do. 4½ % Pref.	10	4½	4½	9⅜ — 10⅜	..	4 5 9
Do. Second 6 % Pref.	10	6	6	10¾ — 11	..	5 9 1
Do. 4½ % Deb. Stock	Stock	4½	4½	93 — 96	..	4 13 9
Brompton & Kensington, Ord.	5	10	10	8⅞ — 9⅜	+ ⅛	6 6 8
Do. 7 % Cum. Pref.	5	7	7	8⅜ — 8½	+ ⅛	4 0 0
Central Electric Supply, 4 % Guar. Deb.	100	4	4	91 — 94	..	4 5 1
Charing Cross, West End & City	5	5	6	5 — 5⅛	+ ⅛	5 11 7
Do. 4½ % Cum. Pref.	5	4½	4½	4⅜ — 6⅛	+ ⅛	4 7 10
Do. "City Undertaking" 4½ % Cum. Pref.	5	4½	4½	4 5/16 — 4 9/16	..	4 18 8
Do. Do. 4 % Deb.	100	4	4	90⅜ — 92½	..	4 6 6
Chelsea, Ord.	5	5	5	4¾ — 5	..	5 0 0
Do. 4½ % Deb.	Stock	4½	4½	95 — 98	..	4 11 0
City of London, Ord.	10	9	10	16 — 17	..	5 17 8
Do. 6 % Cum. Pref.	10	6	6	13 — 14	..	4 5 9
Do. 5 % Deb.	Stock	5	5	115 —118	..	4 4 9
Do. 4½ % Second Deb.	100	4½	4½	99 —102	+1	4 8 1
County of London, Ord.	10	6	7	11⅜ — 12⅛	..	5 14 3
Do. 6 % Pref.	10	6	6	11⅞ — 12⅜	..	4 17 0
Do. 4½ % Deb.	Stock	4½	4½	101 —104	..	4 6 7
Do. 4½ % Second Deb.	Stock	4½	4½	99 —102	..	4 8 1
Edmundson's, Ord.	£3	..	..	⅝ — ¾	..	Nil
Do. 6 % Cum. Pref.	5	6	6	3¾ — 4 xd	..	7 10 0
Do. 6 % Non-Cum. Pref.	5	..	..	1⅝ — 2	..	..
Do. 4½ % First Mort. Deb.	100	4½	4½	80 — 85	+1	5 6 0
Folkestone	5	6	6	5 — 5½	..	5 9 1
Do. 4½ % First Deb.	100	4½	4½	93 — 95	..	4 14 9
Hove	5	8	9	8¾ — 9	..	5 0 0
Kensington & Knightsbridge, Ord.	5	8	9	7½ — 7⅝	..	5 16 3
Do. 4 % Deb.	Stock	4	4	91 — 93	..	4 6 0
Kent Elec. Power, 4½ % Deb.	Stock	4½	4½	74 — 78	+ ½	5 15 5
London Electric, Ord.	3	2⅜	3	1⅜ — 1⅝	..	5 10 7
Do. 6 % Pref.	5	6	6	4½ — 5½	..	5 14 3
Do. 4 % First Mort. Deb.	Stock	4	4	91 — 94	..	4 5 1
Metropolitan	5	4½	4½	8¾ — 9⅜	..	6 0 0
Do. 4½ % Cum. Pref.	5	4½	4½	4⅞ — 4 15/16	+ 1/32	4 18 8
Do. 4½ % First Mort. Deb.	Stock	4½	4½	96 — 99	..	4 11 0
Do. 3½ % Mort. Deb.	Stock	3½	3½	82 — 84	..	4 3 4
North Metropolitan Power Supply, 5 % Mortgages (Red.)	100	5	5	99 —102	..	4 18 1
Notting Hill, 6 % Non-Cum. Pref.	10	6	6	9⅛ — 10⅛	..	5 17 3
Oxford	5	7	7	5⅝ — 6⅜	..	5 10 0
St. James' and Pall Mall, Ord.	5	10	12	9⅛ — 9⅜	+ ⅛	6 3 1
Do. 7 % Pref.	5	7	7	6⅞ — 7⅛	— ⅛	4 18 3
Do. 3½ % Deb.	100	3½	3½	82 — 86	..	4 2 4
South London, Ord.	4	5½	5½	2⅜ — 3⅛	..	6 10 4
Do. 5 % First Mort. Deb.	100	5	5	93 —101	..	4 19 0
South Metropolitan, 7 % Pref.	1	7	7	1 3/16 — 1 5/16	..	5 6 8
Do. 4½ % First Deb. Stock	100	4½	4½	97 — 100	..	4 10 0
Urban, Ord.	£3	Nil	..	⅝ — ¾	..	..
Do. 5 % Cum Pref.	5	8‡	4	2¼ — 3	..	6 13 4
Do. 4½ % First Mort. Deb.	100	4½	4½	84 — 87	..	5 8 8
Westminster, Ord.	5	10	10	8⅜ — 8½	..	5 12
Do. 4½ % Cum Pref.	5	4½	4½	4 13/16 — 5 1/16	..	4 6 9

* Unless otherwise stated, all shares are fully paid. † Interim Dividend. ‡ And Funded Certs.

Continued on next page.

SHARE LIST OF ELECTRICAL COMPANIES.—*(Continued.)*

ELECTRICITY SUPPLY AND POWER—COLONIAL AND FOREIGN.

NAME.	Stock or Share.	Dividends for		Closing Quotations July 21st.	Rise + or Fall —	Present Yield p.c.
Adelaide, 6 % Pref.	£	6	6	5¼ — 5⅝	..	£ 5 11 7
Calcutta, Ord.	£	8½	9	7¼ — 7⅝	..	5 16 2
Do. 5 % Pref.	£	5	5	5 — 5¼	—⅛	4 15 1
Calgary Power, 1st Mort. Bds.	100	5	5	86 — 88	—1	5 13 8
Canadian Gen. El. Com.	$100	7	8	98 —103	..	7 15 6
Do. 7 % Pref.	$100	7	7	116 —121	..	5 15 10
Cordoba Lt., Power and T., Ord.	1	5	..	⅞ — 1	..	7 12 0
Do. 5 % Deb.	100	5	5	80 — 85	..	5 17 8
Elec. Lt. and P. of Cochabamba, 6 % Bonds	100	6	6	82 — 83	..	6 19 6
Elec. Supply Victoria, 5 % 1st Mort. Deb.	100	5	5	95 — 98	+1	5 2 1
Elec. Dev. Ontario, 5 % 1st Mort. Bonds	$500	5	5	93 — 95	..	5 5 3
Kalgoorlie Elec. P. and L., Ord.	10/-	Nil	..	½ — ⅝	..	Nil
Do. 6 % Pref.	£	6	6	¾ — ⅞	..	8 0 0
Kaministiquia Power, 5 % G. Bs.	$500	5	5	99 — 102	..	4 18 0
Madras, Ord.	£	Nil	..	1⅛ — 1⅜	..	..
Melbourne, 5 % 1st Mort. Deb.	100	5	5	103 —106	..	4 14 6
Mexican El. Lt., 5 % 1st M. Bds.	..	5	5	61 — 66	+3	7 11 8
Mexican Lt. & Power, Common	$100	4	4†	46 — 49	+1	..
Do. 7 % Cum. Pref.	$100	7	7	73 — 77	+2	9 1 10
Do. 5 % 1st Mort. Gold Bds.	..	5	5	82 — 87	+6	5 15 0
Do. 5 % 2nd Mort. Bonds	100	5	5	65 — 70	+6	7 2 10

NAME.	Stock or Share.	Dividends for		Closing Quotations July 21st.	Rise + or Fall —	Present Yield p.c.
Monterey Rly., Light & Power, 5 % 1st Mort. Deb.	*	1912.	1913.			£ s. d.
	100	5	5	48 — 53	..	..
Montreal, Lt., H. and Power	$100	9	10†	232 — 238	—3	4 4 0
Northern, Lt., Power and Coal, 5 % 1st Mort. Bonds	$500	5a	5a	10 — 20	..	..
River Plate, Ord.	Stock	10	10	235 —245	..	4 1 8
Do. 6 % Non-Cum. Pref.	Do.	6	6	97 —103	..	5 16 6
Do. 5 % Deb. Stock	Do.	5	5	99 —101	..	4 19 0
Roy. Elec. Co., Montreal, 4½ % 1st Mort. Deb.	100	4½	4½	100 —102	..	4 8 3
Shawinigan Water, Capital	$100	5½	6	134 —138	+1	4 7 0
Do. 5 % Con. 1st Mort. Bonds	$500	5	5	103 —106	..	4 14 4
Do. 4½ % Per. Deb.	Stock	4½	4½	100 —102	..	4 8 3
Toronto Power, 4½ % 1st Deb.	Do.	4½	4½	98 —100	..	4 10 0
Vera Cruz Lt., P. and T., 5 % 1st Mort. Deb.	100	5	5	82½ - 84½	..	5 18 4
Victoria Falls Power, Pref.	1	6	6	1⅛ — ¾	..	8 0 0
West Kootenay Power and Lt., 1st Mort. 6 % Gold	100	6	6	103 - 105	..	5 14 3

MANUFACTURING COMPANIES.

Aron, Ord.	£	7	7	¼ — ⅜	..	8 12 4
Do. 6 % Pref.	£	6	6	⅜ — ⅝	..	7 2 3
Babcock & Wilcox	£	16	16	2¼ — 3	..	5 6 8
Do. Pref.	£	6	6	1⅝ — 1⅞	..	4 8 6
British Aluminium, Ord.	£	..	5	1⅛ — 1⅜	..	4 14 1
Do. 6 % Cum. Pref.	£	1	6	⅝ — ⅞	..	6 9 0
Do. 5 % Prior Liens Debs.	100	5	5	95 — 98	..	5 2 0
Do. Deb. Stk.	100	5	5	90 — 95	..	5 5 3
B.I. & Helsby Cables	£	10	13	104 — 105	+ ½	6 1 0
Do. Pref.	£	6	6	6 — 6⅛	..	4 12 4
Do. Deb.	100	4½	4½	100 —103	..	4 7 5
British Thomson-Houston, Deb.	100	4½	4½	92 — 94	..	4 15 9
British Westinghouse, Pref.	£	Nil	5	1⅝ — 1⅞	..	5 6 8
Do. Deb.	100	4	4	73 — 76	..	5 5 3
Do. 6 % Prior Lien	100	6	6	101 —104	..	5 16 6
Browett, Lindley, Ord.	£	..	..	2/- —3/-	..	Nil
Do. Pref.	£	..	..	8/- —8/6	..	Nil
Brush, 7 % Pref.	£	Nil	..	0 — ½	..	Nil
Do. 5 % Prior Lien Deb.	100	5	5	80 — 85	..	5 17 8
Lo 4½ % Deb.	100	4½	4½	52 — 57	..	7 17 10
Do. 4½ % Second Deb.	100	4½	4½	29 — 88	..	18 12 8
Callender's Cable	£	15	15	11⅛ — 12½	..	6 2 5
Do. Pref.	£	5	5	5 — 5½	..	4 15 3
Do. Deb.	100	4½	4½	97 —100	..	4 10 0
Castner-Kellner	£	20	22½	2⅞ — 2⅞	..	8 15 5
Do. Deb.	100	4½	4½	104 —107	..	4 4 1

NAME.	Stock or Share.	Dividends for		Closing Quotations July 21st.	Rise + or Fall —	Present Yield p.c.
Dick, Kerr	£	Nil	..	⅜ — ⅝	..	..
Do. Pref.	£	6	6	½ — ⅝	..	6 17 2
Edison & Swan, A, £2 paid	£	Nil	..	⅜ — ⅝	..	Nil
Do. fully paid	£	Nil	..	1 — 1⅛	..	Nil
Do. 4 % Deb.	100	4	4	57 — 61	..	6 11 1
Do. 5 % Second Deb.	100	5	5	61 — 66	..	7 11 6
Electric Construction	£	5	5	⅜ — ⅝	—⅛	8 0 0
Do. Pref.	£	7	7	1 — 1⅛	..	6 4 5
Greenwood & Batley, Pref.	£	7	7	6⅝ — 7¼	..	9 13 2
Do. Deb.	100	5	5	92 — 94	..	5 6 5
General Electric, 6 % Pref.	£	6	6	10⅜ — 10⅞	..	5 10 4
Do. Deb.	100	4	4	88 — 92	..	4 7 0
Henley's, Ord.	£	15	20	14½ — 15½	..	6 9 0
Do. Pref.	£	4½	4½	4⅞ — 5⅛	..	4 7 10
Do. Deb.	100	4½	4½	99½ —101½	..	4 8 8
India-Rubber, G. & T.	£	7½	7½	9½ — 10⅛	..	7 2 10
Do. Pref.	£	5	5	9 — 9⅝	..	5 2 7
Telegraph Construction	£	20	20	87½ — 89½ xd	..	6 1 7
Do. Deb.	100	4	4	97 — 99	..	4 0 10
Willans & Robinson, 4 % 1st Mort. Deb.	100	4	..	63 — 67	..	5 19 8
Do. B 4 % Cum. Pref.	100	..	£4	37 — 41	—1	9 15 1

TELEGRAPH AND TELEPHONE COMPANIES.

Amazon Telegraph	£	4½	4½	6⅜ — 6½	..	7 4 0
Do. 5 % Deb. Red.	Stock	5	5	95 — 98	..	5 2 0
American Telep. & Teleg., Cap.	$100	8	8	121 —125	..	6 8 0
Do. Collat. Trust	$1000	4	4	91 — 94	..	4 5 0
Anglo-American Telegraph	Stock	8	8	64 — 67 xd	..	4 9 7
Do. 6 % Pref.	Do.	6	6	107½—108½ xd	+ ½	5 10 7
Do. Def.	Do.	80/-	80/-	28 — 29	— ⅜	6 10 5
Anglo-Portuguese Tel., 5 % Mort. Deb.	100	5	5	102 —104	..	4 16 2
Chili Telephone	£	8	6†	7⅛ — 7⅜	..	5 6 8
Commercial Cable, Stlg. 4 % Deb.	Stock	4	4	80½ — 82½	..	4 17 0
Cuba Telegraph	£	10	6†	8 — 9	..	6 13 4
Do. 10 % Pref.	£	10	10	16 — 17	..	5 17 8
Direct Spanish Telegraph, Ord.	£	5	4	3½ — 4	..	5 0 0
Do. 10 % Cum. Pref.	£	5	10	10 — 12	..	6 9 0
Direct United States Cable	£	10	4	6⅝ — 7⅛	..	5 12 3
Direct W. India Cable, 4½ % Reg. Deb.	100	4½	4½	98 —100	..	4 10 0
Eastern Telegraph, Ord. Stock	Stock	7	7	130 —133 xd	..	5 5 3
Do. 8½ % Pref. Stock	Do.	8½	8½	76½ — 78½ xd	+ ½	4 9 2
Do. 4 % Mort. Deb.	Do.	4	4	95½ — 97½	..	4 2 1
Eastern Extension	£	7	7	12⅜ — 13⅛ xd	+ ⅛	5 5 9
Do. 4 % Deb.	Stock	4	4	96 — 98	..	4 1 8
Globe Telegraph and Trust	£	10	6†	11 — 11½	..	5 4 4
Do. 6 % Pref.	£	10	6	19⅜ — 19⅝	+ ⅛	4 11 4
Great Northern Telegraph	£	10	20	81½ — 83½	..	5 19 5
Indo-European Telegraph	£	25	18	58 — 60	..	5 8 4
Mackay Companies Common	$100	5	5	83 — 85	..	5 17 8
Do. 4 % Cum. Pref.	$100	4	4	67 — 72	..	5 10 1

Marconi's Wireless Telegraph	£	20	20	1¾ — 2⅛	— ⅛	9 13 6
Do. 7 % Cum. Partic. Pref.	£	17	17	1⅝ — 1⅞	+ ⅛	9 7 8
Monte Video Telephone, Ord.	£	6	6	⅛ — ⅜	..	6 8 0
Do. 5 % Pref.	£	5	5	⅜ — ⅝	..	5 18 6
New York Telep., 4½ % Gen. Bnds.	100	4½	4½	100⅜ - 101¼	+ ½	4 8 5
Oriental Telep. and Elec.	£	10	10	2⅛ — 2⅜	..	4 7 6
Do. 6 % Cum. Pref.	£	6	6	1⅜ — 1⅝	..	4 13 5
Do. 4 % Red. Deb.	Stock	4	4	86 — 88	..	4 11 0
Pacific and European Tel., 4 % Guar. Debs.	Do.	4	4	95 — 97	..	4 2 8
Reuter's	£	10	10	7	..	8 9 8
Submarine Cables Trust	£	Cert.	6	7⅜ — 8⅛	..	4 12 4
Telephone Co. of Egypt, 4½ % Deb. Red.	Stock	4½	4½	127 —130	..	4 11 0
United River Plate Telephone	£	8	6†	6⅜ — 6⅝	..	6 0 9
Do. 5 % Cum. Pref.	£	5	5	5 — 5⅛ xd	..	4 11 0
West Coast of America	£	2½	2½	N 7/8 — 1⅛	..	Nil
Do. 4 % Debs., 1 to 1,500 guar. by Braz. Sub. Tel.	100	4	4	96 — 99	..	4 0 10
West India and Panama Teleg.	£	1½	1½	1½ — 1⅝	+ ⅛	8 6 8
Do. 6 % Cum. 1st Pref.	£	6	6	6⅛ — 9½	..	6 9 9
Do. 6 % Cum. 2nd Pref	£	6	6	8⅛ — 8⅝	..	6 16 9
Do. 5 % Debs.	100	5	5	98 —101	..	4 19 0
Western Telegraph, Ltd.	£	7	7	13⅜ — 13⅞	..	5 0 11
Do. 4 % Debs.	Stock	4	4	95½ — 97½	..	4 2 1
Western Union 4½ % Fdg. Bonds	$1000	4½	4½	95 — 100	..	4 10 0

* Unless otherwise stated all shares are fully paid. † Interim dividend. a Paid in deferred interest warrants.

Bank rate of Discount 3 per cent., January 29th, 1914.

Electricity Supply Rifle League.—The following matches were decided during June:—Brimsdown (Mursell, 98), 577, Central (Robinson, 99), 577; Brimsdown (Mursell, 97), 557, City Co. (Harlow, 96), 565; Brimsdown (Dartnall, 98), 568, St. James's (Young, 98), 560; Brimsdown (Mursell, Perry, Rollinson, 97), 574, Poplar (Tait, 92), 542; Brompton (Bartlett, 94), 551, City Co. (Harlow, 97), 567; Brompton (Mugford, 98), 564, Poplar (Mogg, 95), 537; Central (Gaze, 100), 577, Westminster (W. A. Pearman, 106), 574; City Co. (Dutton, 97), 567, Poplar (Mogg, 93), 524; City Co. (Harlow, 95), 550, St. James's (Young, 95), 549; Hackney (Hilling, 96), 550, St. James's (Young, Barrow, 93), 552; Hackney (Hilling, Self, 96), 554, Shoreditch (Thomas, 98), 583; Hackney (Hilling, Smith, 97), 562, Westminster (H. A. Pearman, Neville, 99), 583; Ilford (Haeger, Glazier, 95), 563, Shoreditch 586.

	Shot.	Matches. Won.	Lost.	Drwn.	Pnts.	Scores. For.	Agnst.	Average. per match.
Shoreditch	8	8	0	0	16	4,625	4,433	578·125
Central	9	6	2	1	13	5,145	5,019	571·66
W'stminst'r	9	6	3	0	12	5,055	5,037	561·66
City Co.	9	6	3	0	12	5,010	4,957	556·66
Brompton	9	5	4	0	10	5,073	5,037	563·66
Ilford	9	4	5	0	8	5,036	5,008	559·55
St. James's	8	3	5	0	6	4,444	4,473	555·5
Hackney	9	3	6	0	6	4,980	5,041	553·33
Brimsdown	9	2	6	1	5	5,002	5,045	555·77
Poplar	9	0	9	0	9	4,775	5,095	530·55

Possibles have been scored during June by Mr. Gaze (Central) and Mr. W. A. Pearman (Westminster).

EXPORTS AND IMPORTS OF ELECTRICAL GOODS DURING JUNE, 1914.

THE last month's returns of electrical business, both outwards and inwards, make but a poor showing in comparison with the May figures.

As regards the exports, which reached a total of £462,231, as compared with £618,354 in the preceding month, the telegraphic section alone showed a drop of £100,000, and with the considerable shrinkage in machinery and cable export values, almost accounts for the decreased total. Some increase took place in the goods and fittings sections, but otherwise the export return shows a falling off in every direction.

The imports total of £261,770 compared with £290,878 in May, and in this case also the falling off in business appears to have been general.

The re-exports total of £25,025 showed a decrease of some £6,000 on the preceding month's total.

With the June figures, the half-year's totals become available, and these show an export total for the first six months of 1914 of £3,058,000, as against £3,819,000, the corresponding figure for 1913, showing a considerable decrease. On the other hand, the imports total for the last half-year was £1,647,000, an increase on the corresponding total last year, which was £1,440,000.

Registered Exports of British and Irish Electrical Goods from the United Kingdom.

Destination of exports and country consigning imports.	Electrical goods and appliances.	Wires and cables rubber and other insulations.	Electric lighting fittings and accessories.	Electric glow lamps.	Electric arc lamps and lamp parts.	Electric meters and instruments.	Electric machinery.	Electrically-driven machinery.	Batteries and accumulators.	Carbons.	Telephonic cable and apparatus and electric bells.	Telegraphic cable and apparatus.	Total.
	£	£	£	£	£	£	£	£	£	£	£	£	£
Russia, Sweden, Norway and Denmark ...	2,104	301	56	138	172	1,550	5,785	72	97	36	14,802	12,933	38,046
Germany	3,768	947	111	...	346	51	1,186	97	14	46	212	746	7,524
Netherlands, Java and Dutch Indies ...	530	784	206	40	14	5	1,833	...	191	39	120	132	3,894
Belgium	856	346	181	...	16	134	3,926	57	255	...	1,642	657	8,060
France	390	...	2,796	16	40	36	14,071	164	21	...	64	91	17,689
Portugal	146	...	60	10	57	8	53	...	...	...	842	41	1,695
Spain, Canary Isles and Spanish N. Africa...	1,377	88	337	70	117	10	5,027	50	...	182	247	1,001	8,506
Switzerland, Italy and Austria-Hungary ...	436	88	104	...	378	27	4,854	44	128	63	172	709	7,003
Greece, Roumania, Turkey and Bulgaria ...	660	117	24	12	...	26	1,677	371	57	...	1,480	4,253	8,677
Channel Isles, Gibraltar, Malta and Cyprus...	105	74	144	...	...	...	51	...	...	...	...	279	653
U.S.A., Philippines and Cuba	917	371	553	...	...	14	197	...	40	...	...	669	2,761
Canada and Newfoundland	1,271	1,275	1,934	1,489	124	1,704	18,255	1,195	1,493	11	65	2,622	31,438
British West Indies and British Guiana ...	86	44	79	118	49	101	241	...	34	14	107	16	889
Mexico and Central America	18	66	...	34	...	...	39	...	...	...	...	14	171
Peru and Uruguay	536	63	63	116	...	46	779	120	94	...	...	53	1,870
Chile	199	86	37	...	...	415	1,460	...	198	...	466	878	3,739
Brazil	1,548	1,012	260	517	...	...	7,530	2,610	104	...	61	14,230	27,872
Argentina	12,100	10,320	1,696	825	742	1,166	23,303	13	415	159	455	376	51,570
Colombia, Venezuela, Ecuador and Bolivia...	277	87	108	17	...	...	502	...	1,882	...	58	...	2,931
Egypt, Tunis and Morocco	191	52	39	50	...	6	590	2	16	...	64	179	1,189
British West Africa	146	12	8	76	...	...	93	...	...	147	85	16,313	16,880
Rhodesia, O.R.C. and Transvaal	2,006	3,575	248	786	20	...	1,487	...	17	...	206	1,102	9,447
Cape of Good Hope	1,906	5,677	309	314	147	21	2,560	...	106	...	1,146	2,945	15,131
Natal	1,972	3,782	55	317	56	9	2,997	...	96	46	26	1,187	10,543
Zanzibar, Brit. E. Africa, Mauritius & Aden	127	249	285	346	...	139	982	15	...	...	16	335	2,494
Azores, Madeira and Portuguese Africa ...	179	2,183	39	79	...	...	418	...	36	...	...	88	3,022
French African Colonies and Madagascar...	...	...	...	...	...	...	...	...	...	...	...	...	...
China and Siam	1,108	594	1,070	14	...	619	2,351	33	82	46	...	24	5,941
Japan and Korea	547	...	198	50	...	1,876	7,564	90	80	179	107	348	11,039
India	4,328	6,410	2,407	1,302	45	1,845	27,862	1,975	3,650	476	815	5,065	56,180
Ceylon	526	281	168	44	...	...	840	445	...	...	223	...	2,527
Straits Settlements, Fed. Malay States and Sarawak	1,188	2,000	355	75	33	24	1,409	43	617	46	1,849	483	8,122
Hong Kong	1,735	489	169	16	...	275	1,132	...	66	...	17	78	3,977
West Australia	386	6,358	72	347	13	274	10,000	...	53	28	744	99	18,374
South Australia	286	519	284	376	...	...	2,265	...	9	...	91	86	3,916
Victoria	2,363	3,723	803	1,084	99	96	9,256	368	249	6	317	973	19,337
New South Wales	2,462	4,438	948	1,021	211	315	7,028	2,241	602	295	569	1,442	21,572
Queensland	232	420	118	166	...	19	998	...	69	...	1,257	260	3,539
Tasmania	2	...	60	...	...	13	87	...	53	...	131	...	346
New Zealand and Fiji Islands	3,072	5,303	380	947	144	316	5,374	667	493	...	5,313	1,648	23,657
Total, £	52,086	62,134	16,764	10,812	2,823	11,140	176,540	10,672	11,317	1,819	33,769	72,355	462,231

Registered Imports into the United Kingdom of Electrical Goods from all Countries.

Russia, Norway, Sweden and Denmark ...	10,468	...	10	...	505	...	4,480	402	2,468	...	508	18,841
Germany	4,192	21,479	1,250	4,474	7,892	1,941	76,867	189	3,707	8,413	9,107	139,511
Holland...	...	792	...	337	452	...	125	...	...	233	...	1,939
Belgium	901	7,451	10	135	60	28	938	...	1,775	95	...	11,393
France	230	300	985	2,443	240	1,067	3,174	...	1,310	3,409	1,984	15,142
Switzerland	1,302	448	...	102	3	433	7,469	...	...	129	24	9,910
Italy	...	1,924	...	...	...	...	...	...	102	...	4	2,030
Austria-Hungary	21	3,188	...	243	...	...	48	...	41	164	...	3,605
United States	4,986	178	1,306	54	313	175	16,771	30,197	1,143	677	2,962	58,762
Total, £	22,100	35,760	3,561	7,788	9,365	3,644	109,872	30,788	10,546	13,120	14,589	261,133

Additional imports: Portugal, electrical machinery, £200; Spain, carbons, £270; Canada, goods, £109; arc lamps, £20; machinery, £38.

Registered Re-Exports of Foreign and Colonial Electrical Goods from the United Kingdom.

Various countries, mainly as above... ...	16,260	615	...	2,044	316	...	4,481	...	123	754	432	25,025

TOTAL EXPORTS: £462,231 TOTAL RE-EXPORTS: £25,025 TOTAL IMPORTS: £261,770

NOTE.—The amounts appearing under the several headings are classified according to the Customs returns. The first and third column contains many amounts relating to "goods" otherwise unclassified, the latter, doubtless, consisting of similar materials to those appearing in adjacent columns. Imports are credited to the country whence consigned, which is not necessarily the country of origin.

ELECTRICAL ACCIDENTS IN 1913.

(*Concluded from page* 92.)

Of the accidents to skilled persons, described as "electricians," when working on live conductors, 18 were due to short circuits in the use of ordinary uninsulated spanners or pliers on live switchboards. Three accidents—one fatal—occurred to men when trimming arc lamps. In the fatal case several lamps were connected across one phase of a 440-volt three-phase system through an auto-transformer protected by a double-pole switch. In each lamp circuit was a single-pole switch. One of the lamps was burning badly and required adjustment. As the double-pole switch could not be used without putting out all the lamps, the electrician switched off the one lamp only at its single-pole switch, which, of course, did not cut off the pressure. It was stated that he was in the habit of standing on a piece of board when handling the arc lamps, but on this occasion he omitted to do so and was killed. One of the other cases was similar; the man was rendered unconscious, but recovered. The second fatility was not satisfactorily explained. The man was attending to a motor (500 volts D.C.), and had previously switched off at a double-pole switch. Someone, whether unthinkingly or by way of a joke, appears to have turned the switch on and off again, with a fatal result. The third fatality happened to an electrician when engaged in cleaning insulators of crane trolley wires. He was on a ladder when he received a shock and fell to the ground, fracturing his skull. Most of the accidents in this class need not have occurred, the persons concerned being acquainted with the dangers, and having often only themselves to blame for not taking proper precautions.

The corresponding accidents to unskilled persons differ in this respect. The victims, having little or no knowledge of the dangers, are put to work or are permitted to work under dangerous conditions without proper precautions or supervision by competent persons in authority over them. In most cases there could have been no necessity for the work to be undertaken whilst the conductors were "live." Thirteen of the accidents, including the two fatal cases, were due to such persons being allowed to work close to dangerous live conductors, *e.g.*, crane trolley wires, outdoor transmission wires, normally out of reach, but the work (*e.g.*, painting, whitewashing, building) requiring them to get close to the conductors. In one of the fatal cases, a power company's transmission lines (10,000 volts) passed over the factory grounds to a sub-station. A new building was being erected immediately under the wires, and the building work was proceeded with until the wall and scaffold platform were within 4 or 5 ft. of the conductors. A joiner was then instructed to put up a fence on the platform to prevent the bricklayers from getting near the wires. In putting up the fence he touched one of the wires with his head and was killed. In the second case, power wires (440 volts) crossed some pipes about 14 ft. from the ground and 3 ft. above them. A joint on a pipe just below the wires required repairing, and a plumber who was employed to do the work came into contact with the wires and was killed. In another case a labourer was employed to clean the motors, &c., on Saturday afternoons when the works were shut down. The cleaning was effected by means of an ordinary flue brush with metal wire handle. He also had to sweep the floor of the operating side of the sub-station. There was a screen of expanded metal, 6 ft. 6 in. high, protecting all the live apparatus. Having finished his work, he turned his attention to the extra-high-tension gear within the screen, and appears to have stood on a box and reached with his brush over the screen to dust the high-tension fuses of the potential transformer. Although he caused a short circuit and received a severe shock and burns to his fingers, he was not seriously injured.

The number of accidents in electrical manufacturing works has more than doubled. This is no doubt generally an indication of increased activity in manufacturing, leading to pressure of work in the testing departments of the works concerned. The average age of 63 out of the 66 persons injured is only just over 20 years. This is due to the fact which I have pointed out before, that the testing operations are conducted very largely by apprentices or pupils. This arrangement suits the employers, the pupils having generally had a technical college training, and it is of great service to the pupils in giving them practical experience. Many of the accidents would probably be avoided if there were better supervision of the work by an experienced person. The fatal accident occurred in the testing department of a cable works, and was primarily due to a mistake in switching. A cable had been subjected to a high-pressure test, and the high-tension leads from the test cabin had not been disconnected from the cable at the conclusion of the test. A man went to the cable to do this later on when another cable was about to be tested. Unfortunately the pressure was again applied to the first cable by mistake, and the man handling it was killed. The victim of the accident was also at fault in not having observed the rule of the works as to earthing the test leads before handling them.

Amongst the miscellaneous accidents, one was due to an old form of practical joke, a live wire being attached to a door handle. A similar joke a year or two ago had fatal consequences. In the present case the victim received a serious shock, but recovered. In the two fatal cases death was due to fall. In the first a travelling crane stopped suddenly, and the driver, an unskilled man, in order to ascertain the cause, climbed out of the cage and opened the cover of the main switch. He received a shock and fell to the ground. The stoppage of the crane was subsequently proved to have been due to a fuse falling out of its clip contacts. In the second case an electrically-driven winch was being used to hoist a girder in some building operations. The winch motor was controlled by a liquid controller. The controller failed at a critical moment, becoming short-circuited, and in spite of the full application of the brake the motor continued to creep, with the result that a man was thrown to the ground from a height of 50 ft. The main switch by which the motor might have been stopped on such an emergency was so placed that the driver could not reach it unless he first released the brake.

In my visits during the year I found, apart from works where accidents had actually occurred, numerous examples of dangerous conditions, not only in old work, but also in new installations. This observation applies not only to factory premises where no electrician is employed, but even to public electricity supply and traction undertakings. Although the placard of the Regulations is nearly always duly posted in the works, it is the exception to find that it has been studied by any responsible person with a view to its application to the particular works in question. Many occupiers wait until an accident happens or until irregularities are pointed out by an inspector before taking any steps to remedy defects. Although the total number of accidents (509) is very small, averaging no more than one in perhaps 100 works, the conditions conducive to accident are present in a very much larger proportion, and in many works visited it appears to have been purely a matter of good fortune that accidents have not occurred.

Without attempting to make a list of the numerous irregularities dealt with, a few of the more important may be mentioned. Thus, in the case of high-tension switchboards, it is required by the Regulations that all conductors within reach in any switchboard passage-way shall be protected. In a number of cases passage-ways were found in which bare conductors were exposed all along the side and without any protection. Some, however, were closed by a door at the end, having a notice affixed to the effect that only authorised persons were allowed to enter. In these cases it has been overlooked that it is for the protection of these very authorised persons that this Regulation was framed, and that if anyone at all is allowed to enter while the conductors are live, there must be protection. One of the accidents to an authorised person, referred to above, occurred in such a passage-way. Another most important provision in regard to high-tension switchboards is also sometimes over-looked. When work has to be done on such a switchboard, it is required that the switchboard shall be either made dead as a whole, or if a section only is made dead, that section shall be effectively screened from all adjacent live conductors. The first method can only be adopted in the case of switchboards controlling a supply which admits of being shut down. In stations where the supply has to be maintained continuously the second alternative has to be adopted, yet in such stations switchboards were found without any means provided for screening the live conductors, and so designed that even temporary screening was impracticable. Thus, oil switches, which require periodical attention, were placed close to bare bus-bars and other conductors in such a way that although they could be disconnected by isolating switches, the live conductors could not be screened. In one case, in a public supply station belonging to a local authority, the oil switches were connected directly to the bus-bars, and could not be made dead without shutting down the whole station, and, of course, interrupting the electricity supply to the town. Even in switchboards otherwise satisfactory there is often one piece of apparatus—the bus-bar potential transformer—which has been overlooked in this respect. Although it may be placed in a cell together with its fuses, which are either mounted upon it or on the cell walls, it is connected through the fuses directly to the bus-bars. The conductors in the cell up to and including the fuse contacts cannot be made dead without shutting down the station. These transformers should be protected by isolating switches placed in a separate compartment of the switchboard.

Medium-pressure switchboards are not subject to such stringent provisions as regards protection of live conductors. Safeguards are, however, required. Thus, "insulating screens" or "other suitable means" must be "provided and used when necessary adequately to prevent danger." The provision of insulated spanners is frequently neglected, and, as mentioned above, a number of the accidents occurring at switchboards—13 in public supply stations and 18 in other factories—were due to such neglect. On medium-pressure switchboards the switches are usually placed on the front of the panels, the bus-bars and connections being at the back. With alternating currents, however, oil switches are becoming more widely used, and they are generally placed at the back of the panels, the working handles being on the front. Oil switches require periodical attention involving the removal of the oil tanks. Being at the back of the board with bare conductors all about, special care is needed when they require attention. In the case of switchboards which can be shut down every night or at week-ends, any such work can generally be carried out in safety when the whole board is dead. I have, however, found such switchboards on services which do not permit of shutting down, even on Sundays, in one case on a 650-volt three-phase system, the outside limit of medium pressure. All the connections were of bare copper, and the switches were directly connected to the bus-bars without isolating switches. Such an arrangement is obviously very dangerous when a switch requires overhauling. Two accidents recorded above occurred in attempting to remove the oil tanks from live switches. Such switchboards should be arranged in two or more sections, any one of which may be made dead when necessary, or the individual panels should be separated by screens and isolating switches should be provided for disconnecting each oil switch, as is usual with high-tension switchboards.

Several cases were found where new switchboards were erected, having less than the required space at the back, a mistake for

which there is obviously no excuse. A number of 440-volt three-phase switchboards were found having iron plating for the working platform and no "insulating stands."

A large number of distribution fuseboards for power circuits were found having fuses which could not be handled without risk of touching live metal, and many for lighting circuits having the additional defect that the hand is liable to be burned by the blowing of the fuse. A common type of such fuse, having a porcelain carrier with the fuse wire in a groove on the front, is still widely used. Such fuses do not comply with the Regulations, but are unfortunately widely supplied by contractors. Distribution fuseboards, even of large size for power circuits, are often placed in inaccessible positions, as on a wall 20 ft. from the ground.

One extensive power and lighting installation, 440 volts, three-phase, put up by a foreign firm of contractors, was dangerous in almost every conceivable way. There was bare switchgear over iron floors and some out of doors bare conductors within reach. There was no means of cutting off the pressure from the power circuits except by shutting everything down at the main switch in the sub-station some distance away, and for the lighting circuits the main switch did not cut off the pressure. The lighting was taken from a fourth neutral wire, and one or other of the phase wires. The main switch did not break on the neutral conductor, and this was not earthed, so that it was liable to be live at 250 volts above earth, even with the main switch off.

Many old-type and dangerous hand-lamps were found not only on works, but in public supply stations, and numerous instances of the use of lampholders temporarily rigged up as portable lamps. One of the latter was on alternating current 255 volts to earth, and in a pump house with iron floor.

In drawing attention to these matters, I wish also to record that I have seen many electrical stations and works where attention to safety has been a first consideration and excellent conditions existed. Many electrical engineers to local authorities supplying electrical energy are taking pains to see that their consumers' apparatus is in accordance with the requirements, and notwithstanding the bad examples which I have referred to, more attention is being paid generally to the requirements as to safety. Prosecutions were taken in several districts for breaches of the Regulations, and in some cases heavy penalties were imposed.

Competition and consequent cutting of prices is often responsible for work not being in accordance with the requirements. Thus, the occupier of a factory may order a switchboard from a contractor and may even specify that it is to be in accordance with the requirements of the Regulations, but gives no information as to the conditions under which it is to be used. The contractor asks no questions and supplies an open type switchboard. Such a switchboard is required to have certain space in front and behind and to be in a place set apart for the purpose. The board is, however, destined to be put up in a part of the works quite unsuited for the purpose, where there is insufficient space and where it cannot be fenced off. The purchaser is naturally annoyed when he finds out that it does not comply with the requirements, and the contractor disclaims responsibility as he was not informed as to where it was intended to be placed. Several similar cases were found in regard to high-tension switchboards in public supply stations. In one the engineer had ordered a switchboard, merely specifying that it must provide for the control of so many generators and so many feeders and be in accordance with the requirements of the Regulations, which, however, he had not taken the trouble to study for himself. He obtained from the contractors a switchboard having no protection whatever for the live conductors in the back passage-way, but merely a gate at the end of the passage. The contractor maintains that the switchboard is in accordance with the Regulations, and so it would be if it were not necessary for anyone to enter the passage-way while the conductors were live. Such a condition is, however, impossible in a station which cannot be shut down, and the engineer finds himself with a switchboard which does not comply with the requirements.

With a view to clearing up some points on which there appeared to be some uncertainty as to the requirements, at the request of the British Electrical and Allied Manufacturers' Association, I met in conference a sub-committee of their switchboard section. These conferences have proved very useful, and agreement was arrived at on all the points raised.

BRITISH TRADE IN CANADA.

THE following are extracts from a report on the trade of Canada by Mr. C. Hamilton Wickes, H.M. Trade Commissioner in the Dominion, which has just been published by the Board of Trade. The report itself may be obtained at a cost of 7d. from Messrs. Wyman and Sons, Ltd., Fetter Lane, London, E.C. The extracts being taken from different parts of the report are necessarily disjointed, but they have been chosen to give the essence of the report in so far as it is most likely to interest readers of the ELECTRICAL REVIEW.

TRADE STATISTICS.

Imports of "trade merchandise" in the fiscal year 1912-13:—

Dutiable:—	
Affected by the Preferential Tariff	£92,960,000
" " General Tariff	2,800,000
Free	40,200,000
Total	£135,960,000

Starting with the figure of £135,960,000 of "trade merchandise" imported, a searching analysis was made in order to ascertain:—

1. What proportion of the "trade merchandise" imports into the Dominion could be classified as consisting of goods for the supply of which British manufacturers are in a position to compete—hereinafter described as "competitive merchandise."

2. What proportion of the balance consists of merchandise not of British origin or manufacture, which could, nevertheless, be supplied by the British merchant—hereinafter described as "entrepot trade."

3. What is the proportion of the merchandise or produce imported, which by reason of its character, or the conditions governing its sale, cannot be supplied either by the British manufacturer or the British merchant to the Canadian market—hereinafter described as "non-competitive merchandise."

4. What proportion of the increase, £31,620,000, over the previous year, was made up of goods the United Kingdom could supply.

Imports of "trade merchandise" in the fiscal year 1912-13:

	Value.	Percentage of Total.
Competitive	£76,000,000	55.8
Entrepot	12,920,000	9.5
Non-Competitive	47,040,000	34.7
Total	£135,960,000	

Every detail concerned with the imports of "competitive" merchandise should be of interest. *Only by the share of this trade which is secured should the efforts of the British manufacturers be judged, and only by these figures should the value of the Dominion market to the manufacturers of the United Kingdom be estimated.*

The following figures show the value of the imports from the United States and other countries after making the deductions from gross imports previously referred to:—

Imports from—	Trade Merchandise.	Competitive Merchandise.
United States	£88,770,000	£43,400,000
United Kingdom	27,560,000	25,000,000
Other Countries	19,630,000	7,600,000
Total ...	£135,960,000	£76,000,000

MARKETING OF GOODS.

In this Dominion it is well known that the activities of the British merchant export house, from the Rockies to the Atlantic, are practically non-existent. As a result the value and volume of trade in goods of British origin with Canada has suffered. The loss has not all been borne by Great Britain—the Canadian trader has suffered too, although perhaps he has not realised it, by reason of the absence of facilities afforded by the activities of the merchant organisation. This in other countries has been found helpful to the smaller traders, and still more so to manufacturers, who are brought into touch with world sources of supply of raw and partly manufactured material. In no country except perhaps its neighbour in the south is the handling and storing of goods on arrival and their subsequent distribution carried on at such an extravagant cost.

There are not many British firms of whose manufactures the Canadian market takes sufficient volume at the present time to support an office and staff of their own.

Many difficulties to direct marketing present themselves in the Dominion without the intervention of a representative or agent; of course, there are Canadian firms who visit England to make purchases, but there are few who have offices of their own in the United Kingdom.

In order to develop business an agent in some form or other is, in practice, necessary. While there are British manufacturers operating on this market through their own office, and others through agents who are unexcelled in the thoroughness of their marketing arrangements, the greater number are less fortunately situated. It will be understood that in the ordinary course of the duties attaching to this office a very large number of merchants, importers, and agents engaged in handling a variety of classes of merchandise have been seen and interviewed in connection with the enquiries received from the United Kingdom, as well as other firms who have sought our services in order to be put into touch with British firms and sources of supply. In this way a great deal of experience has been gained of the views that these firms have formed relative to British methods which, in their opinion, hamper or hinder the position of British trade with the Dominion.

Some of the more important points which have been brought to my notice are set out below:—

1. The necessity for a closer study of the technicalities of the export trade, *e.g.*, freights, insurance, exchange, packing and casing of goods.

2. The requirements necessary to obtain the advantages of the preferential section of the Tariff. Knowledge of the leading features of the Intermediate Tariff in favour of France, Belgium, Italy, and the Netherlands. Intimate acquaintance with the Customs Laws and Regulations as compiled from the Customs Act, Orders in Council, and Memoranda issued by the Customs Department.

3. A better knowledge of the terms and credits customarily given on this market to Canadian buyers.

4. The importance of fixing such a "Selling cost price," whether "Ex warehouse," or "*f.o.b.*, U.K. Port," as will adequately cover the agent's commission and other incidental expenses. In many instances also more attention should be paid to the price at which the articles are retailed.

5. The necessity for the selection of suitable agents or representatives. In particular, the terms on which they ought to be employed, taking into consideration the prevailing custom.

6. The preparation of catalogues in Canadian currency, and fixing one ruling rate of discount in place of many varying rates.

7. The adequate supply of samples, with due care that such samples are suitable for the Canadian market, and that the samples asked for by the agent are forwarded.

8. Better knowledge of the geographical features of the Dominion, the distance between the various towns, and the time occupied, and the expense incurred by the agent travelling between the different distributing centres.

9. The necessity for the British principal to read the letters of his agent carefully, answering the questions addressed to him, and paying greater attention to the advice tendered. When this is in the nature of criticism, to try and remove the cause, rather than to assume that the agent is at fault and impertinent in making complaints. British principals are blamed for omitting to reply to criticisms, as well as to enquiries made for information about their goods.

Many, if not all of the above points have, from time to time been brought under the notice of British traders. There is, however, another feature in connection with the selection of agents which should be noted, and in the analysis made of the imports under trades, I have, where the class of goods permitted, tried to differentiate between articles of merchandise:—

(*a*) distributed through wholesalers or jobbers, thence indirectly to the retailer, and

(*b*) goods which rarely pass through these channels, consisting of raw material (mainly unmanufactured), *e.g.*, ores, cotton, wool, &c., and manufactured articles, *e.g.*, machinery and equipment, and appliances, the bulk being consumed or utilised by railway corporations, municipal bodies, manufacturers, mining concerns, contractors, &c.

The manufacturer and trader either already doing business or desirous of opening up trade with this market, whichever of the above categories, (*a*) or (*b*) his products come under, should recognise that essentially different methods are required in order economically and at the same time successfully to secure and hold the market in different classes of goods. For example, few, if any, firms of agents are satisfactorily placed for dealing with goods which form part of both the categories mentioned above. It has been failure to recognise this difference, unfortunately, which has on numerous occasions brought about disaster to the interests of British manufacturers represented overseas and the loss of valuable contracts, resulting in such firms not infrequently refusing to consider direct oversea speculation. They return home and place this export business in the hands of agents residing in the United Kingdom. This method while probably satisfactory as safeguarding them against financial risks, does not conduce as a rule to the development of British trade in the overseas markets.

Trade in Metal Manufactures and Machinery.

The gross imports of all classes of metal manufactures, machines, machinery, equipment, and hardware, amounted to £39,700,000, an increase of £11,700,000 over the previous year. This considerable increase was anticipated in the Report published last year. The proportions of the United Kingdom, United States, and other countries' shares of the total imports are shown below.

Gross Imports.

Total imports of Metal Manufactures and Machinery:—

Country of Origin.	Value. £	Percentage of Total.
United Kingdom	4,450,000	11.2
United States	34,320,000	86.4
Other Countries	910,000	2.3
Total	£39,680,000	

It is small consolation to find that "Other Countries" (than the United States), in their attempt to secure a share of this very important trade, are in a still more parlous condition than the United Kingdom.

The natural advantages enjoyed by the United States are due to:—

1. Easy and rapid access to the market.

2. The fact that freight rates have not been increased from the chief centres of supply to the points of delivery in Canada for several years, while sea freights have been considerably increased.

3. The cost of providing packages being infinitely less to the American manufacturer in comparison with either the British or European manufacturer.

4. The United States currency being the same as the Canadian.

5. Travellers and representatives from the United States crossing the border and finding the same conditions existing, with a demand for goods closely approximating to their own.

6. The great number of American engineers occupying important posts in Canada as heads of the big railway companies, managers of plants and factories, and as consulting engineers.

These and similar advantages give the United States an extraordinary advantage over their European competitors, and the result is reflected in the figures.

Moreover, by the exercise of thought and skill they have strengthened their position artificially by:—

1. The adoption of standards in various lines differing so essentially from those accepted in Europe that the manufactures made to the European standards are rendered still more difficult to introduce. This has further been assisted by the required inspection of equipment and appliances and material in any way connected with "fire hazard" before they could be utilised. (The recent appointment of a firm in London who can inspect goods before shipment has been, and will be, of great assistance in this connection).

2. Arrangements by which some important British and also powerful continental manufacturers are precluded from quoting or competing with the American in the Canadian market.

When both the above series of advantages have been taken into account, affecting as they do so materially the securing of orders, the relatively poor position occupied by the United Kingdom may to some extent be accounted for. There are many instances, however, of goods suitable to the needs of this country and procurable from the United Kingdom at a competitive cost, which never reach this market owing to the indifferent or inadequate methods employed for their marketing.

In the sale of manufactures of metals and machinery there are, as has been stated with general application elsewhere in the report, two widely different classes of buyers or consumers. Perhaps in no trade is this so clearly marked as in the one with which we are now dealing. In the marketing of machines, equipment for factories, &c., neither the wholesale distributing merchant, nor the jobber, nor the retailer is concerned. The buyers to a considerable extent are:—

1. Manufacturers in various lines.

2. Contractors for building and other class of construction.

3. The buying departments of the very important transportation companies.

4. Municipal and other public bodies.

Imports of Equipment in the Year Ended March 31st, 1913.

	Per cent.*	Per cent.†	Per cent.‡	Dollars.	Dollars.	Dollars.
Apparatus, electric, N.O P. switchgear, insulators, batteries, telegraph and telephone instruments	15	25	27½	991,179	5,832,662	6,984,812
Boilers, steam	15	25	27½	58,716	309,849	368.565
Boilers, N.O.P.	15	25	27½	74,695	324,223	398,918
Cable, wire, insulated or covered	20	27½	30	433 706	774,124	1,219,360
Cranes and derricks	15	25	27½	32,028	712,683	744,711
Engines, gasoline	15	25	27½	83,612	3,162,446	3,246.676
Engines, steam	15	25	27½	117,004	360,835	477,839
Engines, fire	22½	30	35	—	37,020	37.020
Fire extinguishing machines and sprinklers	22½	30	35	651	136,124	136,775
Grain crushers	15	22½	25	—	3,080	3,080
Motors, electric, generators, sockets, electric	15	25	27½	194,741	1,312,933	1,589,127
Machinery or plant, all other composed wholly or in part of iron or steel, N O.P.	15	25	27½	2,007,898	17,523,172	19,851,639
Portable machines, all other N.O P. and parts	15	25	27½	1,604	128,774	132,546
				3,995,834	30,617,925	35,191,068

* British preferential tariff. † Intermediate tariff. ‡ General tariff applicable to American goods.

Imports of equipment (including electrical) for workshops, factories, &c., *e.g.*, boilers, cranes, steam and oil engines and electrical transmission apparatus, are by far the most important in value of those under the heading of machinery and equipment, amounting as they do to over £7,000,000. The British share was about £800,000 or 11.1 per cent. The difficulty in dealing with this sub-heading is the enormous value entered under one item, £4,000,000, which includes besides parts of electrical equipment, any or all machinery, not otherwise specified, composed wholly or in part of iron or steel, or iron or steel integral parts of all machinery. This assembly under one heading of articles varying considerably in their character presents great difficulty to adequate treatment.

The imports of insulated wire or cable were some £245,000 from all countries. The United Kingdom secured only about £87,000, although enjoying a 10 per cent. lower duty than the chief competitor.

Quite a considerable proportion of the articles which go to make up this heading are supplied for municipal and other large undertakings. While it is true that there are local manufacturers who are important and have a considerable share of this business, some of these are affiliated with larger American manufacturers in the same lines. It is difficult sometimes when firms are competing for a municipal order to distinguish how far they are quoting on behalf of their own manufacture and how far they are quoting for articles not of Canadian but of American manufacture. Articles of Canadian manufacture are given a preference by many purchasers. There was a recent incident of a great outcry being made by a Canadian manufacturer because his tender was passed, and on investigation it was discovered that he was not tendering Canadian manufactured goods but American.

THE TRAMWAY CONGRESS.

THE proceedings of the sixth annual congress of the Tramways and Light Railways Association were opened in Newcastle-on-Tyne on Thursday, July 16, and continued on the following day. An interesting programme had been prepared for the occasion, the papers submitted touching upon some important points in tramway administration, and the social items had been arranged so as to give the members visiting the congress some idea of the environments of the city, while a trip down the Tyne had been planned so that a glimpse of some of the great works and shipbuilding yards for which the district is famous might be obtained. A garden party was designed to be held at Leazes Park, Newcastle, on Thursday, where the visitors would have been the guests of the Lord Mayor and Corporation, but a terrible rainstorm—the fall for the 24 hours exceeded 1½ inches—put an end to this, and instead the members were entertained by their hosts at the Newcastle Picture House—the newest and one of the finest kinematograph halls in the city. This was followed by a banquet given by the Lord Mayor and Corporation. The trip down the river on the second day was also marred by rain, but fortunately the deluge was not so excessive as that of the preceding day. At Tynemouth tea was provided by the chairman and directors of the Tyneside Tramways and Tramroads Co. On each day arrangements were made for the ladies of the party to visit beauty spots in the neighbourhood, and special tramcars were placed at their disposal. As a wind-up to the proceedings a supper and dance were given by the chairman and directors of the Northern General Transport Co., and the Gateshead, Tynemouth, and Jarrow Tramway Companies.

The congress was held in the Connaught Hall, and in the absence of the Chairman, the Hon. Arthur Stanley, and the Vice-Chairman, Mr. Harry England, who was unable to be present on the first day, one of the vice-presidents, Mr. STEPHEN SELLON, presided.

THE LORD MAYOR OF NEWCASTLE (COUNCILLOR JOHNSTONE WALLACE) welcomed the conference to the city in the name of the Corporation and citizens. They all regretted, he said, that the President of the Association, Lord Chilston, could not be with them, owing to the death of his daughter, and in his bereavement they sympathised with him most deeply. The welcome he (the Lord Mayor) had to give to the conference was a very cordial one. They in Newcastle had not looked very kindly upon municipalisation, and the only municipal venture in the city was its tramway service. Even the tramways had had a very narrow escape, because there was a large section in the City Council in favour of leasing them. Started under the able chairmanship of Alderman Cail, the tramway service was continued under Alderman Sir Joseph Baxter Ellis, and it was now being carried on under the chairmanship of Alderman Rodgers; they embarked one and a quarter millions sterling in it, and they had paid off the sinking fund, £428,000. They had a reserve fund of about £100,000, so that they had not done badly, especially when they took into consideration the distances they carried the passengers for a penny, and the fact that at some points in the city halfpenny fares were in vogue.

The CHAIRMAN suitably thanked the Lord Mayor for his kind words of welcome, and he also expressed the thanks of the Association to those gentlemen and firms who had assisted in drawing up the programme for their entertainment and instruction. He said they all regretted the absence of their President, Viscount Chilston, and suggested that a telegram of condolence should be sent to him, which was done.

The CHAIRMAN, proceeding, said they had also to deplore the death of the Duke of Argyle, their late president, and expressed their appreciation of the very great assistance he had rendered to the Association in its early days. Mr. Sellon remarked upon the valuable services of Alderman Rodgers, the Chairman of the Newcastle Tramways Committee, in co-operating and assisting to make the arrangements for their visit, and complimenting the city upon the success of its tramway undertaking, he said that much of the success which attended it was attributable to Alderman Rodgers, to his Vice-Chairman, Councillor Richard Mayne, and to the General Manager, Mr. Ernest Hatton. They were also indebted to the northern companies who had been good enough to offer them entertainment, and to the Tyneside Tramway Co. Remarking that Mr. Andrew Nance, who was held in the highest esteem by them all, was just now celebrating his jubilee of 50 years, he suggested that a telegram of congratulation should be sent to him, and this was agreed to.

Touching upon the question of the maintenance of roads, the CHAIRMAN said that the whole question of contributions towards the cost of repairing roads was about to receive consideration at the hands of a special Departmental Committee. The Association considered that the present burdens for road maintenance imposed upon tramway undertakings were very harsh and unreasonable. But the whole matter was mixed up with the question of the contributions of motor 'buses, and also the great question of the amount of expenditure rendered necessary for the maintenance of roads consequent upon the extraordinary traffic that was now upon them. It was, therefore, the desire of the Council that the views of the Association should be heard upon this matter, and the Council had sent a letter to Mr. Herbert Samuel expressing the hope that representatives from the Association might be afforded an opportunity of stating the case of tramways before the Departmental Committee.

Newcastle Corporation Tramways.

By COUNCILLOR RICHARD MAYNE.

In a paper on this subject COUNCILLOR RICHARD MAYNE, Vice-Chairman of the Tramways Committee, briefly discussed some features of the system, which comprises 62 miles of single track, with a car-mileage of nearly 5,000,000 per annum. He held that while the best value should be given to users, and the best wages and conditions of service to the employees, the best profits, whether in the form of cash or in that of street improvements and the opening-up of otherwise inaccessible districts, should be returned to the ratepayers, whom he regarded as shareholders. Newcastle is very fully covered with tramways, and the facilities thus provided are appreciated, for the population is carried 204 times in the course of a year. Not all his colleagues supported his view that the profits were the property of the ratepayers. The reserve and renewals fund had been built up to and was kept at £100,000, the surplus available after providing for its replenishment being allocated to the City Fund. Great masses of workmen were carried at low rates—over four miles for a penny—by 100 special cars, the average takings covering the average cost, but not the financial charges on account of the plant required to meet the peak load caused by this traffic. It would have been more just to charge the workmen a little more and to extend cheap fares to classes of small wage-earners which at present had to pay full fares. Parcels too large to be carried on the knees of a passenger were deposited on the platform and charged for at the rate of 1d. each, which brought in a sum of £1,800 to £2,000 per annum without any additional outlay. By granting halfpenny fares for the last half-mile of the principal routes the takings had been quadrupled, but the adoption of a halfpenny fare in the centre of the city had resulted in a loss.

Mr. R. HAMMOND (London) opened the discussion. Mr. Mayne had said that no profits could be deemed divisible until they had brought their reserve fund up to £100,000; that was extremely sound. He took it that the Tramways Committee was making ample provision also for the sinking fund and for renewals. No business was a sound undertaking, whether it

was run by a municipality or by a public company, which sold a portion of its products at a loss, as in the case of the workmen's fares. Why should one class call for more privileges than another? They might almost call it charity. He did hope that steps would be taken towards giving all the workers some little benefit from the undertaking in Newcastle.

Mr. SHEPHERD (Edinburgh) said that Glasgow could adopt halfpenny fares and make them pay, because it had its population living in a congested area, whereas in the English towns facilities were given for the working classes to go outside and live. They in Edinburgh had not adopted them, and did not intend to adopt them. His company did not intend to carry the workmen at a loss. He was struck with Mr. Mayne's remarks with regard to parcel carrying, and he suggested that tramway managers should institute a system of parcel carrying and delivering by messengers. In Edinburgh it brought in a gross revenue of £6,000 per annum, half of which was clear profit.

Mr. G. W. HOLFORD (Salford) foresaw a time coming for the levelling-up of fares, and also saw that they must all introduce charges for the carrying of parcels.

Mr. C. W. MALLINS (Liverpool) said the halfpenny fare was altogether a bad proposition, and would be a parasite upon the remainder of a system.

Mr. H. R. HOGG (Sunderland) pointed out the difficulties of running district tramways at a reasonable profit, and said that many companies, whilst paying the interest of their debenture holders, found it a very hard matter to get anything for the benefit of their ordinary shareholders. If they raised their fares they would incense the people in the district, whose objections might lead them to use the cars less than they did formerly, and yet the existing fares did not give an adequate return. There was no doubt that the tramways served the people in the outlying districts better than did the railways.

Alderman FRED SMITH (Liverpool) said he believed that municipal tramways should make a profit under proper conditions, and should pay their shareholders, who were the ratepayers, a reasonable dividend for the risks they ran; but he could not agree with Mr. Shepherd that municipal tramways should carry parcels. Nor should they have anything to do with workmen's fares or any of the other finicking arrangements that were intended either as class benefits or to catch votes. Let them try to give the people a good service, and let the people pay reasonable fares. In Liverpool they were not prepared to go in for halfpenny fares, free fares for the blind, school children's halfpenny fares, and the various other methods of vote-catching, because everyone was entitled to concessions if one was entitled to them. In order to be just they could not afford to be generous to any one particular class.

Mr. SAUNDERS (Maidstone) gave it as his experience that the introduction of halfpenny fares had resulted in a loss of revenue; the only concession tramway undertakings could afford was to grant weekly tickets to the workmen.

Alderman J. H. RODGERS, replying to a question put by Mr. Hammond, said that loans for cars were extended over fifteen years, for machinery over twenty years, and for track work over thirty years, and each loan was so arranged that it was paid back in equal yearly instalments over the period covered. Newcastle had put £1,175,000 into her tramways, and of that sum £488,000 had been paid off the capital in the twelve years that they had been running. The reason why they insisted upon the reserve fund figure of £100,000 was that they regarded £25,000 as one year's renewals, and they therefore always kept four years' renewals in hand. Although halfpenny fares operated successfully in Glasgow, they could never be a financial success in Newcastle.

Councillor RICHARD MAYNE replied to the discussion briefly, and thanked the congress for the manner in which they had received his paper. He agreed that halfpenny fares would be parasites upon the remainder of the system, but pointed out that the halfpenny fares in vogue in Newcastle were terminal fares.

Tramways in Brazil.

Mr. H. M. SAYERS described his experiences in tramway construction in Santos and São Vicente, in the State of São Paulo, Brazil. The supply of skilled labour was unsatisfactory, and the unskilled labourers were mostly Portuguese, Italians and Spaniards, requiring close surveillance. The author preferred the Portuguese, but Italians were particularly good at electrical work. "Lightning" strikes were not infrequent, and there was a strong tendency to violence among the men. Few subordinates were fit to undertake responsibility, so that an excessive amount of detail work was imposed upon the staff. Much trouble also resulted from the lack of experience and fixity of purpose on the part of the engineering authorities of the city, and from the fact that many of the roads were only marked out and not made up. It was necessary also to keep the existing routes operated by mules in service until in each case an electric service was ready to replace it. Great difficulties were experienced due to the unreliable nature of the subsoil, consisting of fine sand, which caused subsidences, especially where drainage operations were in progress near the track; concrete stringers gave way, and had to be replaced with wooden sleepers in many places. Expansion of the rails by heat also gave trouble through "pumping," which was remedied by grouting with pitch or "Plascom," a method worth trying in new construction. For shipment it was found advantageous to use the floor and roof of each car as the bottom and lid of a packing case, containing all the seats, posts, etc., so that each package was complete in itself, and there were no separate boxes of small parts to go astray. Perishable parts should be packed watertight, and axle journals, etc., should be painted or well greased to prevent corrosion in transit. The cars should be unpacked under cover directly they arrive, as lying packed up in the open in the tropics causes rapid deterioration. A profitable goods traffic was organised on the tramways with motor-equipped open and box wagons and trailer wagons. Care must be taken, when working an undertaking of this kind at a great distance from the source of supply, to order all stores, spare parts, etc., long before they will be wanted, as strikes and other unforeseen events may cause serious delays in delivery.

DISCUSSION.

Mr. SHEPHERD gave some experiences he had when attempting to negotiate a concession before the Turkish war broke out. One way and another they were called upon to pay as presents, in order to obtain the concession they were asking for, no less a sum than £350,000. His experience was that it was better to keep money in this country rather than to try to make new openings in foreign countries.

Mr. C. G. TEGETMEIER (London) said that if Mr. Shepherd's last remarks applied also to British dominions abroad, he could not agree with it. The Auckland Tramways were now running over 42 track miles, and taking £280,000 a year in fares, which represented nearly £3 per head per annum of the whole population. They found concrete stringers entirely inapplicable, and these had to be replaced by wooden sleepers, which were now standing most effectively.

Mr. HUMPHRIES (South Staffordshire) said his experience of concrete stringers was that they were an abomination. Transverse sleepers, running for many miles over colliery sinkings, were found to be the proper class of foundation.

Mr. SAYERS, replying to the discussion, said the tramways in the American cities paid very well. He could not tell Mr. Shepherd how much it cost to get the concession, and he himself did not know where some of the price money went to.

Standard Tramway Rails.

In a very brief paper, Mr. FRED. BLAND introduced the subject of standardisation of rail sections, a question which has been prominent during the past twelve months, and is now under the consideration of the Engineering Standards Committee. Existing British Standard sections were compared with French and German sections, showing little difference

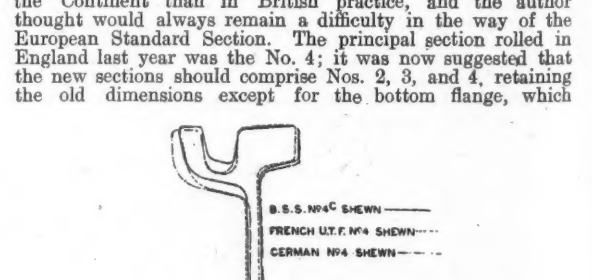

FIG. 1.—COMPARISON OF BRITISH, FRENCH AND GERMAN STANDARD RAILS, NO. 4 SECTION; AND AMERICAN PROPOSED STANDARD, FIG. 11.

except in the depth of the groove, which is ¼-in. deeper on the Continent than in British practice, and the author thought would always remain a difficulty in the way of the European Standard Section. The principal section rolled in England last year was the No. 4; it was now suggested that the new sections should comprise Nos. 2, 3, and 4, retaining the old dimensions except for the bottom flange, which

FIG. 2.—BRITISH, FRENCH AND GERMAN STANDARD RAILS, SECTION NO. 4, COMBINED.

would be reduced to a uniform width of 6½ inches. It had also been proposed that a new British Standard Section, No. 6, weighing 112 lb. per yard, should be adopted. The radius of the running trend should be made twelve inches, as all tram rails took that radius approximately, after several years' wear. American sections were useless for European conditions. It was to the interest of tramway engineers to use two rails only, either 6½ in. or 7 in., and to use Standard rails in all renewals, so as to enable manufacturers to stand-

ardise, and to stock rails and points and crossings. The question of standardising points and crossings had been very carefully gone into, and a report containing valuable information was before the Engineering Standards Committee.

DISCUSSION.

The CHAIRMAN said this subject was of vital importance to the tramway industry, and he would like a good discussion upon it, in order that the Standardisation Committee might have the benefit of suggestions.

Mr. SHEPHERD drew attention to the difficulty his company was having with the Edinburgh municipality. Their rails were laid with old Dick Kerr joints. His company said those rails had seven or eight years' life in them yet, and contended that they were entitled to get that life out of them. What was the opinion of the congress on this point?

Mr. ROBSON (South Shields) commented upon the absence from the paper of any reference to the centre-groove rail, which had been used at Hull and Doncaster with extraordinary success. At the joints it gave complete absence of hammering.

Mr. J. W. DUGDALE (Oldham) said the rail spoken of by Mr. Robson was not a standard rail, and the idea of the paper, he took it, was to lead the congress to a consideration of standard rails.

Mr. MALLINS, referring to the point put forward by Mr. Shepherd, said certainly the company should have the seven or eight years' life out of the rails.

Mr. PICKERING said that standardisation would help the manufacturer, because he could standardise patterns, reduce the cost of output, and probably cheapen the rails.

Mr. BLAND, replying, said that during the past seven years 150,000 tons of British standard rails had been rolled as compared with 60,000 tons of the ordinary sections, and that showed the great importance of the standard sections.

THE BANQUET.

On the Thursday evening the Lord Mayor and Corporation of Newcastle entertained the members and others to a banquet at Messrs. Tilley's Rooms, New Market Street. The Lord Mayor (Mr. Johnstone Wallace) presided, and was supported by the Lady Mayoress, Alderman J. H. Rodgers, chairman of the Corporation Tramways Committee; Councillor R. Mayne, vice-chairman; Sir Joseph and Lady Ellis, the Recorder of Newcastle (Judge Atherley Jones), Mr. C. G. Tegetmeier, Mr. C. Shireff-Hilton, Mr. F. Coutts, Mr. E. H. Edwards, Mr. J. W. Dugdale, Mr. J. Cameron, and Mr. Fred Bland, members of the Council of the Association; Mr. A. De Turckheim, secretary; Alderman H. Linsley, president of the Municipal Tramways Association, and other gentlemen.

The loyal toasts having been duly honoured,

Alderman J. H. RODGERS proposed "The Tramways and Light Railways Association." He said that was the sixth annual conference that had been held by the association, and they had covered the principal towns in the United Kingdom. During the last five years the association had more than doubled its membership, which was open to anyone who was in any way connected with tramways. The association took an active part in defending the rights of all, as they were very frequently shot at by all kinds of public bodies. But they fought unitedly against those bodies much better than they could individually.

Mr. STEPHEN SELLON responded, pointing out that although that was their sixth conference, it was in the early days of the nineties that they applied for and obtained incorporation. Municipal and company alike, the association knew no politics. Under the efficient management of Mr. De Turckheim, on whom too much praise could not be bestowed, they were now, perhaps, one of the most efficient associations in the industry, and they did very important work. Alderman Rodgers, Councillor Mayne, and Mr. Hatton were at the head of one of the finest municipal undertakings in the country, and the financial results that had been presented to the association that day showed that the undertaking was carried on on proper business lines.

Councillor RICHARD MAYNE proposed "Kindred Associations," coupling with the toast the name of Alderman H. Linsley, chairman of the Salford Corporation Tramways, and president of the Municipal Tramways Association.

Alderman LINSLEY, responding, thanked the association for having invited him to their conference, and said he hoped to return their hospitality when the conference of the Municipal Tramways Association assembled at Salford. On more than one occasion the Municipal Tramways Association and the Tramways and Light Railways Association had acted jointly, and he felt that by joint action their influence was always very much greater than it would be if they acted separately.

The health of the chairman was also honoured, and briefly responded to.

During dinner a high-class musical programme was provided by Mr. H. G. Amers's orchestra, and in the interludes between the speeches the company was entertained with some delightful vocal numbers given by a concert party consisting of Madame Dorothy Forster, Miss Elsie Taylor, Mr. Maurice Pearce, and Mr. William Hendry, with Mr. Fred Jeavans acting as accompanist. Mr. Tom Hoffman gave humorous selections.

(To be concluded.)

FOREIGN AND COLONIAL TARIFFS ON ELECTRICAL GOODS.

AMENDMENTS.

BRITISH GUIANA.—The regulations under the Preferential Tariff here limit the preferential treatment of British goods to such goods as are shipped direct from the United Kingdom to the Colony. The Board of Trade are now informed that goods trans-shipped at Barbados for British Guiana on a through bill of lading from the United Kingdom are, at the present time, treated as direct shipments for the purpose of the above-mentioned regulations, and that in such cases the certificate of origin prescribed for "direct" shipments will be required to be furnished to the Customs authorities for the entry of goods at preferential rates of duty. Under the head of "Port of Ultimate Destination" in the certificate it is desirable to state in such cases "Demerara via Barbados." New preferential regulations are now awaiting the sanction of the British Guiana legislature, and when these become effective goods trans-shipped at Barbados on a through bill of lading from the United Kingdom will not be entitled to entry into the Colony under the British Preferential Tariff.

HOLLAND.—The Dutch Customs Authorities have issued the following decisions as to the treatment to be afforded to certain goods imported into Holland:—

Advertisements or show card framed even without glass	5 p.c. *ad val.*
Fusible plugs for boilers	free.
Automatic apparatus for keeping driving belts at the right tension	free.

UNITED STATES.—The American Customs Authorities have decided that celluloid in sheets which have been advanced beyond the condition of unpolished sheets by subjection to hydraulic pressure are to be dutiable at the rate of 40 p.c. *ad val.*

SOUTH AFRICA.—The Government have decided that for the purpose of estimating the amount of duty prescribed by the tariff whenever levied on goods *ad valorem*, and for the purpose of the declaration and oaths which may at any time be required by law or regulation in relation to the question of such duty, the value for duty purposes of those goods shall be taken to be the "true current value" for home consumption in the principal markets of the country from which and at the time when the goods were imported, including carriage to the port of shipment and the cost of packing and packages, provided that in no case shall the value for duty be less than the cost of the goods to the importer at the port of shipment.

CANADA.—The Canadian Customs Authorities have decided that dental switchboards shall be dutiable as electric apparatus, the rate of duty being 15 p.c. under the British preferential tariff and 27½ p.c. under the "general" tariff on foreign goods.

AUSTRALIA.—The Australian Customs Authorities have decided that a combination switch and ceiling rose for pendants shall be admitted free of duty.

Electric Motor Vehicles.—A NEW USE FOR THE KINEMATOGRAPH.—The latest use of the kinematograph is in connection with the encouragement of the use of electric motor vehicles, a film with that object having lately been produced by the Edison Storage Battery Co., of New York. The film depicts the experiences of a New York business man, in the purchase of an electric motor lorry, and while there is a distinct vein of wholesome humour throughout the "play," it is highly educational. The merchant is first shown wrestling with the problem of horse unreliability and mortality. He is confronted with a letter from the Electrical Vehicle Association, of America, and decides to inquire into the question of electric haulage. Calling up the Association on the 'phone, he secures additional data and figures, and is called upon by the local central station representative. A consulting engineer is then called in to assist in solving the technical problems. Next he is given demonstrations of different vehicles, and being finally convinced, he signs a contract for 10. The final picture shows him enjoying the savings effected in delivery by electric vehicles as against his old horse-drawn vehicles, by purchasing and using a pleasure-type electric carriage.

Scientific Research.—At the annual meeting of the Society of Chemical Industry in Nottingham last week, the presidential address of Sir William Crookes was read. He said the world was still greatly in need of able researchers, and discoveries of vast importance were awaiting their Newtons. But was not the attitude of the public towards investigators lacking in understanding and imagination, and did not the authorities treat scientific exploration in a niggardly spirit? Scientific research was being starved. The allotment of public moneys to the furtherance of scientific work, the tangible recognition of the services of scientific men, the provision of opportunities for all kinds of investigations of scientific problems without reference to their immediate commercial value—these were the benefits they looked for at the hands of the Government and of the nation.—*Times*.

NEW PATENTS APPLIED FOR, 1914.

(NOT YET PUBLISHED).

Compiled expressly for this journal by Messrs. W. P. THOMPSON & Co., Electrical Patent Agents, 285, High Holborn, London, W.C., and at Liverpool and Bradford, to whom all inquiries should be addressed.

16,045. "Electric switches." J. H. TUCKER. July 6th.

16,063. "Process for the manufacture of electrodes." SCHOTT & GEN. July 6th. (Addition to 17,759/13. Convention date, July 21st, 1913, Germany.) (Complete.)

16,068. "Electric clock systems." A. R. UPWARD. July 6th.

16,080. "Control systems and devices for electric current. SOC. ANON. DES ETABLISSEMENTS L. BLERIOT. July 6th. (Convention date, July 7th, 1913, Belgium.) (Complete.)

16,087. "Controlling electric motors." STOTHERT & PITT, LTD., and E. S. FRANKLIN. July 6th.

16,093. "Electric motors, or dynamos, more especially intended for use for starting or igniting the internal-combustion engines of motor road vehicles or for other purposes where light weight and compactness are required." W. H. SCOTT. July 6th.

16,094. "Electric light dimming for use with electrical prepayment meters." G. O. A. BLACKMORE. July 6th.

16,095. "Synchronous booster rotary converters." P. M. LINCOLN. July 6th. (Convention date, July 19th, 1913, United States.) (Complete.)

16,101. "Cells for electric storage batteries and the like." O. OLDHAM. July 6th

16,102. "Apparatus for cleaning out the cells of electric storage batteries and the like." O. OLDHAM. July 6th.

16,126 "Apparatus for the electric welding or soldering of thin objects by means of indirect heating." ALLGEMEINE ELEKTRICITATS GES. July 6th. (Convention date, August 12th, 1913, Germany.) (Complete.)

16,149. "Electric lamps." F. SMITH and T. J. LOACH. July 7th.

16,170. "Process for banding projectiles." S. O. COWPER-COLES. July 7th.

16,171. "Process for the removal of phosphorus from iron and steel and the like." S. O. COWPER-COLES. July 7th.

16,172. "Recovery of copper from weak copper sulphate solutions." S. O. COWPER-COLES. July 7th.

16,173. "Process for the treatment of ores containing iron and copper." S. O. COWPER-COLES. July 7th.

16,174. "Process for the manufacture of metallic strips and ribbons by electrolytic means." S. O. COWPER-COLES. July 7th.

16,175. "Electro-deposition of alloys." S. O. COWPER-COLES. July 7th.

16,176. "Process for coating metal plates and the like." S. O. COWPER-COLES. July 7th.

16,177. "Construction of pipes." S. O. COWPER-COLES. July 7th.

16,178. "Process for the recovery of copper, gold, silver and iron from sulphide ores." S. O. COWPER-COLES. July 7th.

16,203. "Central-contact electric incandescent lamp floats or foot-lights." M. CHALIER. July 7th. (Convention date, July 15th, 1913, France.) (Complete.)

16,214. "Electrical lighting and power installations and plants." R. H. GOULD. July 7th.

16,234. "Automatic selector switches." C. A. W. HULTMAN. July 7th. (Convention date, July 11th, 1913, Germany.) (Complete.)

16,251. "Recording mariners' compasses" R. KENNEDY. July 8th.

16,263. "Electric furnaces." J. L. DIXON. July 8th.

16,287. "Devices for supporting overhead trolley wires for electric railways, tramways, and the like." H. W. H. RICHARDS. July 8th.

16,308. "Spark-plugs." P. A. NEWTON. July 8th. (A. R. Mosler, United States.) (Complete.)

16,315. "Electrical device for controlling race-starting barriers." A. BURT July 8th.

16,316. "Telephone installations in which the subscribers' lines are grouped according to the frequency of the calls." SIEMENS & HALSKE AKT. GES. July 8th. (Addition to 28,751/12. Convention date, September 25th, 1913, Germany. (Complete.)

16,318. "Circuit interrupters." J. N. MAHONEY. July 8th. (Convention date, August 11th, 1913, United States.) (Complete.)

16,319. "Control systems for electric motors." A. J. HALL and L. G. RILEY. July 8th. (Convention date, July 9th, 1913, United States.) (Complete.)

16,327. "Electric circuit-controlling devices." BRITISH THOMSON-HOUSTON CO., LTD. July 8th. (General Electric Co., United States.)

16,328. "Systems for the control of moving bodies at a distance by radiant energy." J. H. HAMMOND, JUN. July 8th. (Convention date, July 14th, 1913. United States.) (Complete.)

16,340. "System of connections for telephone installations in which the work of the operators is supervised from special observation places." E. C. R. MARKS. July 8th. (Siemens & Halske Akt. Ges., Germany.) (Complete.)

16,342. "Telegraphy." E. C. R. MARKS. July 8th. (International Quadruplex Co., United States.) (Complete.)

16,343. "Telegraphy." E. C. R. MARKS. July 8th. (International Quadruplex Co., United States.) (Complete.)

16,363. "Electric lamp holders or other coupling members." G. ST. J. DAY. July 9th.

16,380. "Receiving arrangements for wireless telegraphy." R. C. GALLETTI. July 9th.

16,407. "Plug contact for use in electro-plating." S. R. BAILEY and A. H. FOLWORTHY. July 9th.

16,411. "Automatic telephone systems." BETULANDER AUTOMATIC TELEPHONE CO., LTD., G. H. BRYANT, and F. M. WARD. July 9th.

16,418. "Relays and indicators." STERLING TELEPHONE & ELECTRIC CO., LTD. July 9th. (Telephon Fabrik Akt. Ges. vorm. J. Berliner, Germany.) (Complete.)

16,424. "Apparatus for calling attendants." STERLING TELEPHONE & ELECTRIC CO., LTD., and F. G. BELL. July 9th. (Partly communicated by Telephon Fabrik Akt. Ges. vorm. J. Berliner, Germany.) (Complete.)

16,433. "Electrical heating apparatus." M. A. V. LONDON. July 9th.

16,471. "Electric relays." EASTERN TELEGRAPH CO., LTD., and B. DAVIES. July 10th.

16,485. "Conversion of alternating movements into rotary motion, the invention being applicable, for example, to winding drums." A. A. QUICK. July 10th.

16,490. "Means for obtaining high starting-torques at low speeds from electric motors and for retaining them over a wide range of speeds." A. J. LEIGH and H. J. OSBORNE. July 10th.

16,507. "Automatic transmitters for use in electric telegraphy. J. F. A. TROTTER. July 10th.

16,509. "Secondary batteries." O. OLDHAM. July 10th.

16,566. "Spark-plug tester and accumulator-terminal tester for use in all kinds of motors." W. FOSTER, A. GLASBY, and C. T. LITTLE. July 11th.

16,575. "Electrical relays." A. H. RAILING and C. C. GARRARD. July 11th.

16,578. "Electrolytic relays." W. JUDD, A. FRASER, and EASTERN TELEGRAPH CO., LTD. July 11th.

16,583. "Method of and apparatus for electrically transmitting patterns and pictures in textile machines." OESTERREICHISCHE SIEMENS-SCHUCKERTWERKE and REGAL PATENTE G.M.B.H. July 11th. (Convention date, July 12th, 1913, Austria.) (Complete.)

16,590. "Cooling arrangements for dynamo-electric machinery." SIEMENS BROS. DYNAMO WORKS, LTD., and E. O. KIEFFER. July 11th.

16,595. "Electric alarms." J. BANNEYER. July 11th. (Complete.)

16,612. "Electric hair brushes." V. SENCE. July 11th. (Complete.)

16,619. "Selectors for automatic telephone systems." G. A. BETULANDER and N. G. PALMGREN. July 11th. (Complete.)

PUBLISHED SPECIFICATIONS.

Copies of any of the Specifications in the following list may be obtained of MESSRS. W. P. THOMPSON & Co., 285, High Holborn, W.C., and at Liverpool and Bradford; price, post free, 9d. (in stamps).

1913.

14,140. APPARATUS FOR EMITTING ELECTRIC WAVES. W. P. Thompson (Compagnie Universelle de Telegraphie et de Telephonic Sans Fil.) June 18th.

14,258. DEVICES OR APPARATUS FOR REGULATING, CONTROLLING, OR LIMITING THE SPEED OF INTERNAL-COMBUSTION ENGINES. H. D. Chatfield. June 19th.

14,481. PROCESS FOR THE MANUFACTURE OF CONDENSATION-PRODUCTS FROM PHENOLS AND FORMALDEHYDE, AND OF NEW MATERIALS FORMED THEREWITH. H. Stockhausen and R. Gruhl. June 23rd.

14,518. METHOD AND APPARATUS FOR THE ELECTRICAL SOLDERING OF METALS. Allgemeine Elektricitats Ges. June 23rd. (June 21st, 1912.)

14,524. TELEPHONE SYSTEMS. W. Aitken. June 23rd. (Patent of addition not granted. Cognate application 16,859/13, 18,349/13, 19,521/13, and 19,988/13.)

14,532. DEVICE FOR CONTROLLING THE SPEED OF, OR STOPPING TRAINS AND THE LIKE BY MEANS OUT OF CONTROL OF ENGINE CREW. A. Findlay and J. D. F. Findlay. June 24th.

14,699. ELECTRIC HEATING APPARATUS. A. F. Berry. June 25th.

14,760. ELECTRIC LAMPS FOR ARTIFICIALLY PRODUCING DAYLIGHT EFFECTS. F. R. Boardman, R. V. Boardman and F. Boardman. June 26th.

14,771. ELECTRIC SIGNALS FOR RAILWAYS. A. R. Mutton. June 26th.

16,066. PROCESS OF PRODUCING FILAMENTS OR WIRE OF TUNGSTEN AND TUNGSTEN ALLOY. E. A. Kruger. July 11th.

16,078. SPARKING-PLUGS. F. A. L. Johnson. July 12th.

16,167. CONTROL OF DIRECT AND ALTERNATING CURRENT ELECTRIC MOTORS. H. H. Jowers. July 14th.

16,214. ELECTRIC HEATING APPARATUS FOR WATER AND OTHER FLUIDS. H. De Kok. July 14th. (November 30th, 1912.)

18,068. LAMP FOR VEHICLES. T. L. Griffiths. August 8th.

19,104. FUSIBLE ELECTRIC CUT-OUTS. O. L. Peard. August 22nd

19,182. PHASE TRANSFORMATION OF ELECTRIC CURRENTS. British Electric Transformer Co., and R. Crosbie-Hill. August 23rd.

20,126. COIN-FREED TELEPHONE APPARATUS. G. A. Long. September 5th.

20,800. IGNITION DEVICES FOR INTERNAL-COMBUSTION ENGINES. Pohl es Fiai (firm of). September 15th. (February 26th, 1913.)

22,798. ELECTRIC SWITCHES. A. V. I. Bickerstaff. October 9th.

24,850. ELECTRIC FURNACES. I. Rennerfelt. October 31st. (December 5th, 1912.)

26,570. TELEGRAPHIC TRANSMITTERS. G. Visca. November 19th.

27,744. PROCESS FOR FUSING REFRACTORY MATERIALS. Dr. E. Podszus. December 2nd. (December 2nd, 1912.)

28,802. SWITCHING APPARATUS FOR TELEPHONE SYSTEMS. Western Electric Co. (Woodward, acting for Western Electric Co.) December 13th.

1914.

38. ELECTRODES FOR ALKALINE ACCUMULATORS. Svenska Ackumulator Aktiebolaget Jungner. January 1st. (January 16th, 1913.)

2,790. WIRE-ROPE ELECTRIC INSULATOR COUPLINGS. C. C. Sunderland. February 3rd. (May 5th, 1913.)

2,849. ELECTRICAL INSULATORS. K. Von Kando. February 3rd.

3,291. SINGLE OR MULTI-PHASE ELECTRIC FURNACE FOR TREATING MOLTEN METALS. P. Lescure. February 7th. (February 7th, 1913.)

3,478. APPARATUS FOR MEASURING DECREMENTS OF ELECTRO-MAGNETIC WAVES. F. A. Kolster. February 10th. (September 22nd, 1913.)

3,835. ELECTRIC FURNACES. Soc. Electro-Metallurgique de St. Beron. February 13th. (February 20th, 1913.)

8,146. INSTRUMENT FOR MEASURING RONTGEN RAYS. R. Grisson. March 31st. (April 25th, 1913.)

8,595. ELECTRIC WELDING MACHINES. Allgemeine Elektricitats Ges. April 4th. (April 4th, 1913.)

9,265. DIAPHRAGM FOR ELECTRO-CHEMICAL OR ELECTRO-OSMOTIC PURPOSES. Ges. Für. Elektro-Osmose. April 14th. (April 14th, 1913.)

10,380. CAM RING FOR THE INTERRUPTOR OF ELECTRIC IGNITION DEVICES. Robert Bosch (firm of). April 27th. (March 5th, 1914.)

10,980. ELECTROLYTIC MANUFACTURE OF ALKALI METALS AND ALKALI METAL COMPOUNDS. E. A. Ashcroft. May 4th.

The Horse-Power of a Rain Storm.—After a severe rain storm, a correspondent of *Power* was interested enough to make a calculation of the energy liberated. The rainfall amounted to 4·17 in. in 10 hours, over a surface of approximately 10 square miles, and the estimated average height of the rain cloud was 5,000 ft. This represented approximately 6,000,000,000 lb. of water which had fallen during 10 hours from an elevation of 5,000 ft., or 15,000,000 H.P.-hours. Suppose man could avail himself of this energy and store it so that it could be used at pleasure; for instance, for lighting city streets with 4,000 arc lamps. Allow 500 watts per lamp, making 2,000 KW. load during the lighting period, equal to 2,680 H.P., or, including losses, say, 3,000 H.P. Allowing 12 hours in 24 as the lighting period, the daily load would amount to 36,000 H.P.-hours. The length of time this energy would last would be 425 days, or one year and two months of light from one storm. This gives some idea of the enormous energy at work in nature.

American Electric Vehicle Convention.—On the occasion of the fifth annual convention of the Electric Vehicle Association, to be held in Philadelphia on October 19th, 20th and 21st, there will be an exhibit of electric vehicles, batteries and accessories, which will form a special section of the Philadelphia Electrical Show, to be held October 19th-24th. It is expected that the electric vehicle exhibit will be the most comprehensive, interesting and instructive that the public has ever seen.—*American Electrical Review.*